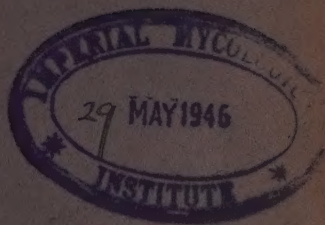


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## DISEASES CAUSED BY BACTERIA AND FUNGI

HALM, O. W. (1944.) Merits and deficiencies of mastitis diagnostic methods.—*J. Amer. vet. med. Ass.* 55: 398-405. 550

S. surveys the known indirect diagnostic methods, as a result of tests on a large number of samples, finds that the only test comparable with direct plating on blood agar is a combination of the Hotis test with mination of smears of incubated milk. The Hotis in this trial detected 84.3% of samples known to contain *Streptococcus agalactiae*, while the microscopic mination revealed 93.8%. If a milk sample is titative to both these tests, there is a strong probability that *Str. agalactiae* is present.—R. M. LOOSMORE.

EBER, G. (1942.) Ueber erbliche Grundlagen der Tuberkulosedisposition. [Hereditary and TB.]—*Beitr. Klin. Tuberk.* 97: 352-355. [Abst. from abst. in *Bull. Inst. Pasteur.* 41: 278-279.] 551

G. pigs belonging to a number of pure lines, which have been bred by brother and sister matings for 20 generations, were injected subcutaneously with 0.01 µg. virulent tubercle bacilli. All the g. pigs, except those belonging to one line (strain XI), died from generalized TB. within a period of one year. Those belonging to strain XI survived up to two years. In them the lesions were of a chronic type, being well isolated and with a tendency to caseation, features which were very different from the more acute lesions seen in the other lines. W. considers that strain XI showed an hereditary resistance to infection and also an hereditary predisposition to localization in certain organs.—H. I. FIELD.

EGER, E. M., & FELL, H. B. (1945.) Warm-stage observations on the initial development of the avian tubercle bacillus cultivated in embryo extract.—*J. Hyg., Camb.* 44: 158-169. 552

Avian tubercle bacilli were studied over several days while growing in centrifuged embryo extract in hanging drop preparations on a warm stage. Several stages of division are described. The standard type, which is characteristic of rapid initial growth, consists of elongation of the bacillus, forming a filament several times its original length. After 24 hours, this divides into a number of filaments and on the second or third day, these subdivide into short rods, which continue to divide by simple binary fission indefinitely. If these bacilli are subcultivated the cycle is repeated. When division is slow, either long filaments are formed which do not break up, or there is segmentation of short segments or simple binary fission. Bacilli on the surface sometimes assume raft forms, with mosaic patterns, or sometimes which tend not to break up completely. Occasionally a mycelial form is observed; in this case a mycelium of filaments is formed by branching of the

original filaments from buds, into secondary and tertiary filaments. In one mycelium studied for 22 days, growth declined after the tenth day. Acid-fastness declined after the fifth day.—R. M. LOOSMORE.

GERBER, I. E., & GROSS, M. (1945.) Inhibition of growth of *Mycobacterium tuberculosis* by a mold product.—*Science.* 101: 616-617. 553

A product isolated from a culture of an unidentified mould of the Aspergillaceae inhibited the growth of human type *M. tuberculosis* grown on Long's or Dorset's medium. The active material appears to be an ether-soluble acid.—E. BOYLAND.

CORY, R. A. S. (1945.) Acid-fast bacilli in non-tuberculous pulmonary disease.—*Amer. Rev. Tuberc.* 52: 36-45. [Spanish summary.] 554

Two cases of pulmonary abscess formation in man are described in which a diagnosis of TB. was made on account of the presence of acid-fast bacilli. Cultures were obtained which grew like typical tubercle bacilli but the organisms were non-pathogenic for the usual laboratory animals.—R. E. GLOVER.

ARMAND-DELILLE, P. F., & GYSIN, O. (1941.) Etude des propriétés pathogènes et vaccinales de bacilles acido-résistants de type S (lisse) isolés du sang au cours de l'infection tuberculeuse évolutive chez des jeunes sujets. [Pathogenic and immunizing properties of S type acid-fast bacilli isolated from the blood in progressive TB. in young persons.]—*Ann. Inst. Pasteur.* 66: 5-25. 555

In two cases of fulminating TB. in young children tubercle bacilli were found in the blood. In each instance, two types of colony were isolated, a rough form which was moderately virulent for g. pigs and a smooth colony which apart from the production of a local non-progressive adenitis, was completely non-pathogenic for g. pigs, rabbits, calves and monkeys. These strains produced tuberculin on Sauton's medium and fixed complement with an antigen from an avirulent strain of the avian type.

G. pigs vaccinated subcutaneously with these strains were completely resistant to a virulent test dose which killed controls in 60-90 days. A high degree of resistance was also induced in monkeys, particularly when vaccination was performed intravenously.

—R. E. GLOVER.

HARTSOUGH, G. R. (1945.) Isolation of *Erysipelothrix rhusiopathiae* from farm-raised mink.—*J. Amer. vet. med. Ass.* 107: 242-243. 556

H. reviews briefly the literature dealing with the occurrence of *Erysipelothrix rhusiopathiae* in man and various species of animals and birds in the U.S.A. and records for the first time its isolation from two mink.



On a mink farm, losses occurred in young weaned animals and a number of carcasses were examined bacteriologically, *E. rhusiopathiae* being isolated in pure culture from one of these. Following this, carcasses of mink received from other sources were examined for the presence of this organism by injecting liver and spleen emulsions into pigeons, and one positive finding was made from a mink from Minnesota.

A series of eight healthy young mink was injected with cultures and none of them showed any ill-effects. H. considers that *E. rhusiopathiae* is non-pathogenic for young healthy mink, but may be pathogenic or behave as a secondary invader in mink on a deficient diet or suffering from other diseases.

The source of infection of the two mink was not determined but livers condemned at slaughter houses for cavernous angioma, or raw fish were possible sources. —M. C.

KYAW, M. H. (1944.) Pathogenesis of *Pasteurella septica* infection in developing chick embryo.—*J. comp. Path.* 54. 200-206. 557

K. infected chicks with *Past. septica* via the chorio-allantoic membrane, killing them off at intervals of 3-52 hours to study the development of the infection. A cellular and exudative inflammatory reaction was first seen on the chorio-allantoic membrane; this extended later to the visceral organs of the embryo. There was a lack of phagocytosis of the organisms and although up to 30 hours there was considerable tissue damage of the liver and spleen, bacteria could not be seen in sections or isolated in culture.

K. considers that these findings indicate a toxæmia preceded before death by bacterial invasion.—D. L. H.

URBAIN, A., NOUVEL, J., & BULLIER, P. (1944.) Pseudo-tuberculose du lion (*Felis leo* L.). [Pseudo-tuberculosis in the lion].—*Bull. Acad. vét. Fr.* 17. 333-336. 558

The authors record the isolation of *Pasteurella pseudotuberculosis* from the heart blood, lung lesions and liver of an aged lioness which had died in a zoo. The symptoms and P.M. lesions are described, as are the cultural characteristics and pathogenicity of the organisms which were isolated. The source of infection was not known, but it had been the practice to give the lion the carcasses of small animals, such as rabbits and g. pigs.—M. C.

BURROUGHS, A. L., HOLDENRIED, R., LONGANECKER, D. S., & MEYER, K. F. (1945.) A field study of latent tularemia in rodents with a list of all known naturally infected vertebrates.—*J. infect. Dis.* 76. 115-119. 559

In the course of an intensive search to discover plague-infected rodents, which was made in an area adjacent to San Francisco Bay, latent tularemia was found in the brown rat (*Rattus norvegicus*), meadow mouse (*Microtus californicus*), and white-footed deer mouse (*Peromyscus maniculatus*). None of their ectoparasites was found to be infected and it is suggested that in rodents living closely together in burrows, aerogenic transmission of the disease is possible. A complete list of vertebrates known to be naturally infected with tularemia is appended. This includes six species not previously reported, viz. the Wyoming ground squirrel (*Citellus richardsonii*), Columbian ground squirrel (*Citellus columbianus*), white-footed deer mouse (*Peromyscus maniculatus*), wood rat (*Neotoma fuscipes*), black-tailed jack rabbit (*Lepus californicus*), and domestic calf (*Bos taurus*).—D. D. OGILVIE.

GRAY, D. F. (1942.) Bacterium *friedlanderii* in canine cystitis.—*Aust. vet. J.* 18. 238-240. 560

A case of chronic cystitis in a dog associated with *Bact. friedlanderii* infection is described. G. admits the possibility of the infection being secondary, but the organism was present in the urine in pure culture and was actively phagocytosed; partial recovery under treatment with hexamine and full clinical recovery with sulphonamide P. [sulphanilamide] was accompanied by a decline in the numbers and the final disappearance of the organism. The article includes a discussion of the classification of the organism and its preliminary serological examination.—D. A. GILL.

DOLD, H., & KETTERER, M. (1944.) Vergleichende Untersuchungen ueber die Lebensdauer (Nachweisbarkeit) der Bakterien der T.P.E.-Gruppe (B. typhi, B. paratyphi B Schottmüller, B. enteritidis Gärtner und Breslau) und der Bakterien der Ruhrgruppe in flüssigem und an Filtrierpapier angetrocknetem Stuhlmaterial. [Comparative trials of the duration of viability of bacteria of the typhoid-paratyphoid-enteritis group (*Salmonella typhi*, *S. paratyphi* B, *S. enteritidis* and *S. typhi-murium*) and of the dysentery group in fluid stools and in stools dried on filter paper].—*Z. Hyg. InfektKr.* 125. 444-456. [Abst. in *Bull. Hyg., Lond.* 20. 102, copied *verbatim*. Signed: J. C. CRUICKSHANK.] 561

Experiments were performed with fluid stools from patients suffering from enteric fever, *Salmonella* infections and dysentery, and with normal stools moistened with saline and inoculated with various pathogenic organisms. One drop of the infected material was allowed to dry on each of a number of pieces of filter paper. The faecal specimen and the filter papers were stored at room temperature in the dark, and recovery of the pathogen on Endo's medium was attempted at intervals.

The organism was recoverable from the filter paper in each case for a very much longer period than from the original stool. The day-to-day results, which are given in detail, show the comparatively early disappearance of *Bact. coli* and *Proteus* from the filter paper, so that in some cases a pure culture of the pathogen was ultimately obtained.

The average duration of viability observed in a series of experiments is shown in the accompanying table.

	In fluid stool	On filter paper
	Days	Days
<i>Bact. typhosum</i> ...	4	90
<i>Bact. paratyphosum</i> B ...	11.5	174
<i>Bact. enteritidis</i> ...	8	>39
<i>Bact. dysenteriae</i> (Sonne and Flexner Y) ...	9	30

The agglutinability of the organisms recovered from the filter paper was unimpaired.

— (1943.) Deutsches Reich. Runderlass des Reichsministers des Innern, betr. Bekämpfung der Enteritis-Infektion in Rinderbeständen. [Germany: circular concerning control of salmonella infection in cattle].—*Reichsgesundheitsblatt.* 18. 93. 562

The control of salmonella enteritis in cattle was to proceed along the following lines:—

In a suspected herd, the faeces of all cattle and the blood of all those over three months were to be tested; when both those proved negative and the animal was not suspect clinically there were to be no further tests,



t when these were positive and the animal was suspected. Further examination was to be made within 7 days. Urine tests were to be made of blood-positive animals (other than calves) whose faeces proved negative. Animals from whom salmonella could be isolated from the urine and faeces for a period of 30 days or longer were to be destroyed, as were animals with negative urine and faeces whose blood tests had three times proved positive. In blood tests a titre of 1:200 was to be taken as positive and a titre of 1:100 as doubtful.

Where pigs and horses were found to be infected with *S. dublin*, cattle on the farm were also to be examined, since this organism might give rise to specific vaccine infection. When *S. typhi-murium* was isolated, turkeys, pigeons, mice and rats were to be considered a possible source of infection. When *S. paratyphi-B* was isolated the medical authorities were to be informed of the case of human infection on the farm.

Milk examinations were to be discontinued. Instructions are given to ensure conservation of agar supplies and the best nutrient media are described.

—S. M. G.

TER, H. (1943.) Sterilität und Brucellosebekämpfung. [Sterility and control of brucellosis.]—*Dtsch. Tierärztl. Wschr./Tierärztl. Rdsch.* 51/49. 207-209. 563

R. considers that insufficient attention is paid to the careful clinical study of the genital tract of individual animals in infected herds. Brucellosis varies widely in its manifestations within different herds, from an acutely spreading infection with numerous clinically diseased animals to a very low-grade chronic disease with little obvious ill-health. In the former case, the clinical detection of affected animals and the prompt institution of hygienic measures and suitable treatment during the outbreak more rapidly to an end and enable her methods of control to be used. Nothing new is reported.—E. G. WHITE.

URMOTSEV, S. N. (1944.) Materialy po ispitaniyu poluzhidkoi formolvaktsiny protiv brucellēza. [Semi-liquid formal vaccine against brucellosis.]—*Veterinariya, Moscow*. No. 2-3. pp. 8-10. 564

M. gives the results of five years' investigation of formal vaccine, which is now established as completely harmless to animals. Agglutinins in the blood generally appear 2½-3 months after vaccination. In a healthy pup of vaccinated cattle, 2-3% of the animals react to the agglutination test within 3-4 months and 70-80% of the animals vaccinated react positively to the complement-fixation test. The period during which the animals react to the c.-f. test has not yet been investigated. The immunizing properties of the vaccine were investigated in several different laboratories using both pigs and sheep; results were satisfactory. 22 young calves introduced into a brucellosis-infected herd, were not infected eight months after vaccination. It is suggested that large-scale tests should be made on 10,000 head of cattle.—A. CARTER.

SEEM, A. W., & CROSS, F. (1945.) Abortion following the vaccination of pregnant cows with strain 19.—*J. Amer. vet. med. Ass.* 106. 213-214. 565

The authors warn of the dangers of indiscriminate use of strain 19 and describe difficulty arising from the continuation of a positive agglutination titre in a cow which had aborted prior to vaccination. Two examples are quoted in which the vaccination of pregnant animals was followed by abortion. In the first herd, in which the cattle were all negative to the aggl. test at the time of vaccination, 23 calves were born dead, three premature calves lived and 31 were apparently normal. In

another herd 56 cattle were vaccinated, only two being positive at the time of vaccination. Two abortions took place in the previously negative cows and two others gave birth to premature calves which lived. The two positive cows produced normal living calves. In both these herds cultures were isolated which culturally and biologically could not be differentiated from strain 19.

—S. J. GILBERT.

PRIETO, D., & PIRES, A. (1944.) A propósito de la rhinosporidiosis. Presentación de un caso en un caballo. [A case of rhinosporidiosis in the horse.]—*Gac. vet., B. Aires*. 6. 323-336. 566

The authors record a case of equine rhinosporidiosis of an indigenous animal in the Argentine. One previous case is on record, but this occurred in an imported animal. The growth was removed, but recurred six months later. A description is given of the organism and of the histopathology of the nasal papillomatous growths which resulted from the infection.—U. F. R.

BATTELLI, C. (1944.) Sopra alcuni casi di aspergillosi aviaria in Eritrea. [Avian aspergillosis in Eritrea.]—*Boll. Soc. ital. Med. Ig. trop. (Ses. Eritrea), Asmara*. 4. No. 5-6. Reprint pp. 14. [English summary.] 567

Avian aspergillosis is rare in Eritrea, and only three cases (one fowl and two turkeys) were observed in Asmara over a period of several years. B. describes observations made on material derived from these cases. *Aspergillus fumigatus* was isolated; the cultural characters, fermentation and other chemical reactions are described in detail. Parenteral introduction into fowls, pigeons, rabbits, and g. pigs induced a rapidly fatal disease, which frequently included nervous symptoms with paresis and rotation of the head. Oral administration often produced a disease of chronic course and cachectic nature and sometimes included nervous symptoms. Intranasal instillation failed uniformly to produce symptoms.

An alcoholic extract was prepared from cultures on Sabouraud's medium dried by evaporation at 37°C. and emulsified in distilled water. This emulsion when inoculated into a rabbit intravenously produced an acute toxæmia, convulsions and death within a few hours. Autopsy revealed punctiform haemorrhages and sero-haemorrhagic exudation into the abdominal cavity. The action of the metabolic products of the fungus was tested by inoculation into two rabbits, a fowl, a pigeon, and a g. pig, of a filtrate from a culture in acid peptonized broth. In one rabbit given 4 ml. intravenously, a preliminary excitation was followed by paresis within 48 hours and death on the third day. The second rabbit, given 2 ml. intravenously, and the g. pig, given 3 ml. subcutaneously, developed a fatal affection with a less acute cachectic course. Death followed in 14 and six days respectively. In these cases the affection resembled the disease produced by infection with the fungus itself. The birds (a fowl given 2 ml. and a pigeon given 1 ml.) remained unaffected. No symptoms were observed in animals inoculated with an extract, obtained by autolysis in distilled water at 37°C., of fungal spores previously subjected to 70°C.

B. concludes that in the course of infections with this organism some of the symptoms are due to absorption of toxic products from the localized mycelium.

—J. ALLAN CAMPBELL.

DECHAMBRE, E., GUILLOT, G., & ROTH, P. (1944.) Quelques cas d'aspergillose chez des oiseaux de volière. [Cases of aspergillosis in caged birds.]—*Bull. Acad. vét. Fr.* 17. 369-371. 568

The authors list the species of birds from zoological gardens in which aspergillosis has previously been



recorded. In the present paper the occurrence of aspergillosis is recorded in a tanager (*Tanagra* sp.), a European flamingo (*Phoenicopterus ruber antiquiorum*), a king vulture (*Gypagus papa*), and a cormorant (*Phalacro-*

*corax carbo*). In all cases the diagnosis of the disease was confirmed by culture of *Aspergillus fumigatus* from the lesions, the sites and nature of which are fully described. —T. E. GIBSON.

See also absts. 590, 689 (cocci), 700-703 (mastitis), 704, 705, 764 (TB.), 707, 746 (*Haemophilus*), 628 (pasteurella), 708 (*Proteus*), 709 (coliform paratyphoid organisms), 744 (meat-poisoning organisms), 747 (pullorum disease), 754 (brucellosis in the U.S.A.), 697, 710, 711 (clostridia), 596 (behaviour of pathogens in insects), 713 (actinomycosis), 680 (toxicity of mouldy fodder), 687-690 (antibiotics).

## DISEASES CAUSED BY PROTOZOAN PARASITES

ROUBAUD, E., & PROVOST, A. (1940.) Infection inapparente de la poule par *Trypanosoma rhodesiense*. (Deuxième note.) [Inapparent infection by *Trypanosoma rhodesiense* in fowls. II.]—*Bull. Soc. Path. exot.* 33. 410-412. [For previous article, see *V.B.* 10. 414.] 569

In further experiments on the susceptibility of fowls to *T. rhodesiense*, the bird previously infected was reinoculated with mouse blood containing the trypanosome, and three other cockerels were also inoculated. No trypanosomes were seen in the fowls, but the blood of the first bird again became infective to mice, as did the blood of one of the three new birds. The infectivity was never retained longer than a month. It is pointed out that only a small proportion of the inoculated mice developed infection, which suggests that the trypanosomes are very sparse in the blood of inoculated fowls. —U. F. RICHARDSON.

JACOB, E. (1943.) Zur Verbreitung der Kokzidienarten bei Schafen, Ziegen und Rehen. [Coccidiosis of the sheep, goat and roe deer.]—*Berl. Münch. tierärztl. Wschr.* [Wien. tierärztl. Mschr. August 6th. 258-260.] 570

Among 100 sheep which appeared to be in perfect health, 91 were found to be infected with coccidia. Oocysts were observed at all seasons. When present, the thick-walled *Eimeria intricata* was always accompanied by other species, of which *E. arloingi* was the most common, occurring in 58 cases; it then followed *E. parva* in 52 animals. *E. parva* was also found in goats and deer. Contrary to results obtained in N. America, *E. faurei* was found by itself in 12 sheep; this species is not host-specific as it can be found in various species of horned and antlered animals. —C. HORTON SMITH.

\*KOTLÁN, S. (1942.) [Coccidiosis.]—*Közl. Összeh. élet- és kórtan Körebl.* 30. 405. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* 51. 34.] 571

K. believes that there is nothing in FEKETE's work on the significance of chemical action in the feeding of rabbits, to necessitate revision of the views hitherto held regarding the pathogenic action of coccidia in rabbits. Intestinal coccidia must still be regarded as a primary cause of disease and this applies also to the cases of inflammation of the duodenum described by Fekete. —C. HORTON SMITH.

CARVALHO, J. C. M. (1944.) The coccidia of wild rabbits of Iowa. II. Experimental studies with *Eimeria neoleporis* Carvalho, 1942.—*Iowa St. Coll. J. Sci.* 18. 177-188. [For part I, see *V.B.* 14. 191.] 572

Study of the endogenous cycle of *E. neoleporis* revealed three and probably four generations of merozoites. The third generation can give rise to gametocytes as well as to another generation of merozoites. Oocyst elimination was studied in both domestic rabbits and cottontails and proved to be much heavier in the latter, when the same numbers of oocysts were administered to each. Domestic rabbits appear to resist the infection,

but cottontails are susceptible and may lose half their original weight. Loss of appetite and diarrhoea may occur. Serial passages through domestic rabbits failed to show physiological or pathological modification and oocysts of the fifth passage caused normal infection when fed to cottontails. Fairly heavy doses of oocysts administered to domestic rabbits produce an acquired and total immunity to *E. neoleporis* while lighter doses produce an acquired and partial immunity.

Age resistance appears to exist in adult domestic rabbits, but adult cottontails have no such resistance. Host colour has no influence upon the infection or the parasite. —C. HORTON SMITH.

CRAWFORD, M. (1945.) *Plasmodium gallinaceum*, a malarial parasite of the domestic fowl.—*Vet. Rec.* 57. 395-396. 573

In view of the great importance of *P. gallinaceum* as experimental material in research into human malaria and its chemotherapy, this account is of particular interest and value. C. includes an historical account of the discovery of *P. gallinaceum* as a preliminary to a consideration of its occurrence in nature, symptoms produced by it, P.M. findings, morphology of the parasite, its pathogenicity, transmission and treatment. The only records of the parasite are from Indochina, Sumatra, Ceylon and probably India. In Ceylon, it appears to be restricted to certain localities in the low country wet zone. The natural host is probably the wild jungle fowl. C. examined the blood of a small number of healthy jungle fowl in Ceylon without finding the parasite. He considers that if the jungle fowl is the natural host it is possible that a high degree of immunity exists and that the possibility of heavy infections in chance-shot wild specimens is remote. Outbreaks in Ceylon have always occurred in poultry yards among fowls imported from Great Britain, whereas native breeds in the same yards appear to remain perfectly healthy. In very acute cases, birds become huddled and their faces and combs highly congested; 80% of the blood corpuscles are parasitized. Less acute cases are characterized by paleness of the face and comb, accompanied by loss of condition and greenish diarrhoea. Less frequently other birds show paralysis after they have appeared to recover from an acute attack as a result of treatment with quinine. Enlargement and darkening of the spleen and a clear yellow fluid in the pericardial sac are observed P.M. The exo-erythrocytic forms found in monocytes and in reticulo-endothelial cells of the spleen, liver and kidney and especially in the capillaries of the brain are large, unpigmented schizonts containing up to 50-60 merozoites. With the exception of Ceylon native breeds, fowls of all breeds are readily infected by the inoculation of infected blood or by the bite of an infected mosquito. The parasite persists in a recovered bird for as long as two years. Transmission is affected by *Stegomyia fasciata* [*Aedes aegypti*] and *A. albopictus*. Successful treatment has been obtained in Ceylon with doses of up to 5 grains of quinine per day for five days. Glauber's salt has been added to the drinking water during treatment. —C. HORTON SMITH.



BRACKETT, S., & HUGHES, C. O. (1945.) Chilling as a means of retaining the viability of the sporozoites of *Plasmodium gallinaceum*.—*J. Parasit.* 31. 288-289. 574

To save time in the preparation of infective material, whole mosquitoes were ground in a tissue grinder and the larger particles of chitin etc. were removed by training through layers of gauze. Suspensions were prepared in normal chicken serum. At room temperature the viability of the sporozoites decreased during the period of about an hour required to inoculate 200-400 chicks: there was a significant difference in parasitaemia on the eighth day of infection. Four separate tests showed the average parasitaemia of the terminal control group in a series of 200 birds to be only 10.23 and 11.6% of the average parasitaemia of the initial control group. It was thought that sporozoites might retain their viability to a greater extent if the ground mosquito material was chilled as soon as possible and left in an ice-bath during the period of inoculation. A more uniform infection was obtained with this procedure. The chilled preparation also exhibited an increased virulence. It was concluded that chilling pooled sporozoite material gives more uniform infections throughout a series of animals in the same experiment.

—C. HORTON SMITH.

ARTIOLI, D. (1943.) Osservazioni e ricerche sulla spirochetosi cutanea del maiale in Eritrea. [*Cutaneous spirochaetosis of the pig in Eritrea.*]—*Boll. Soc. ital. Med. Ig. trop. (Sez. Eritrea), Asmara.* 2. No. 5. Reprint pp. 18. 575

Cutaneous spirochaetosis is a disease of young pigs, usually 2-7 months old, which occurs sporadically or enzootically in some regions of Eritrea. It appears most frequently between the months of June and October, when the rainfall is high and night temperatures are beginning to fall. A. describes the symptoms and lesions in a study based on some 50 cases from various parts of the territory. The disease is usually manifest in necrotic ulcerative lesions on the head, principally on the nasal dorsum. The jaws, buccal membranes, ears

See also absts. 601, 714-716 (trypanosomiasis), 717 (hexamitiasis), 718, 719, 749 (malaria).

## DISEASES CAUSED BY VIRUSES AND RICKETTSIA

HERZOG, E. (1945.) Histologic diagnosis of rabies.—*Arch. Path.* 39. 279-280. 576

Histological examination of the ganglion nodosum of the vagus nerve by rapid staining of frozen sections with cresyl violet is considered for the following reasons to have several advantages over the examination for Negri bodies in Ammon's horn and by other histological methods.

In over half of 52 cases no Negri bodies could be found in Ammon's horn by Lentz's method, whereas characteristic degenerative changes of the nerve cells, with marked neuronophagic proliferation of the capsular cells of the ganglion nodosum were seen in all of the 52 cases. Although these changes are not specific to rabies they are not found in the same form in other diseases which have to be considered in the differential diagnosis. The ganglion nodosum is easily accessible even in the beheaded animal and is relatively resistant to putrefaction. The method permits of diagnosis in less than one hour.—H. SCOTT McTAGGART.

COMPTON, L. S. (1945.) Rabies in wild foxes.—*Cornell Vet.* 35. 68-72. 577

This is a popular account of a widespread outbreak of rabies in wild foxes and of the control measures undertaken and lays stress upon the importance of publicity

and face are frequently involved. Lesions on other sites are comparatively rare. The ulcers contain a grey evil-smelling pus; they become progressively more extensive and involve the deeper tissues. All tissues including bone may become affected. The disease runs a chronic course, general symptoms are not apparent in the earlier stages and death usually follows rapidly after secondary developments such as purulent bronchopneumonia from inhalation, or enteritis from ingestion of purulent matter. Cases occur in which no vital organs are involved and the animal dies in a state of extreme emaciation.

In bacteriological examinations of the pus from lesions, spiral organisms are invariably found. These vary widely in morphology, being 5-20  $\mu$  in length and possessing 2-5 spirals. Contaminating organisms are abundant and include cocci, diphtheroids, anaerobes and Gram-negative rods. Fusiform bacilli are not present in conspicuous numbers and in some cases appear to be absent. A successfully cultivated the spirochaetes on Tarozzi media (serum agar, defibrinated blood and peptone water), but he failed in all attempts to isolate them from the numerous bacterial contaminants.

Experimental inoculation of matter from lesions and of spirochaetes in contaminated cultures, respectively, into swine produced in each case typical lesions at the site of inoculation and the chronic fatal course of the naturally occurring disease. In calves, sheep, a goat kid, a monkey, a horse and an ass, temporary lesions developed from which spirochaetes were recovered, but in these animals granulation and healing resulted. In g. pigs only a very transient lesion developed. Rabbits usually succumbed to septicaemia, which was probably due to the bacterial contaminants.

Local treatment with a variety of antiseptics has little or no value. Organic arsenicals are effective in early cases and cures were achieved after treatment with neosalvarsan and myosalvarsan Bayer, but these drugs are ineffective in cases with extensive advanced lesions.

—J. ALLAN CAMPBELL.

with the object of informing and educating the public through the press. Special "dog wardens" were appointed to enforce regulations for the control of stray dogs and licensing of other dogs. It is stated that trained fox hounds refused to follow the trail of rabid foxes. When put on such trails the hounds would follow for a short distance and then return frightened.—M. C.

McLEAN, I. W., BEARD, D., TAYLOR, A. R., SHARP, D. G., & BEARD, J. W. (1945.) The antibody response of swine to vaccination with inactivated swine influenza virus.—*Science.* 101. 544-546. 578

Having access to purified concentrated influenza virus, the authors carried out quantitative studies on the antibody-inducing capacity of influenza vaccine, using swine as the test animals and the swine influenza virus as the antigen. The antibody response was measured by the capacity of the serum taken at weekly intervals to inhibit the haemagglutinin reaction. Formalin-inactivated, ultra-violet-light-inactivated and alum-adsorbed virus were used.

Antibody production was more efficient and long lasting when repeated small doses of vaccine were given than when a single large dose was given; the effectiveness of the vaccine depended to a large extent upon the interval between inoculations. Formalin and ultra-



violet vaccines behaved alike; adsorption on alum did not greatly enhance the titre or prolong its antibody level.—W. R. KERR.

PATTISON, I. H. (1945.) Histological evidence indicating that a form of equine encephalomyelitis occurs in Palestine.—*J. comp. Path.* 55. 109-116. 579

A description is given of a nervous, non-fatal disease of equines which on clinical grounds was diagnosed as E.E. Material obtained from three horses involved in two mild epizootics (1941 and 1942) and from three sporadic cases (1943) was subjected to a detailed histological examination. In acute cases, there was a generalized inflammatory reaction throughout the brain with vascular and perivascular infiltrations, while in chronic cases there were, in addition, degenerative changes in the nerve cells confined almost entirely to the spinal cord. No inclusion bodies were found.

Tissues from one case were inoculated into rabbits, g. pigs and mice without result.

P. considers that, in addition to the low mortality, the condition in Palestine can be differentiated from Borna disease on histological grounds. He also suggests that it is more closely related to a type of E.E. described by SHIRLAW [see *V.B.* 11. 23] in India than to the American Eastern or Western E.E. viruses.

—R. E. GLOVER.

BANKIER, J. C. (1945.) Equine infectious anaemia. Attempted vaccination with crystal violet tissue vaccine.—*Canad. J. comp. Med.* 9. 197-199. 580

Virus of E.I.A. inactivated by crystal violet combined with glycerin possessed no appreciable immunizing properties for susceptible horses. The intradermal inoculation of virus in a dilution of 1:10,000 did not produce infection in 55 days nor did it stimulate an appreciable degree of immunity. One of four colts resisted the challenge inoculation, but this animal had been inoculated earlier with lymphocytic choriomeningitis virus and the possibility of cross-immunization is suggested. Further study is contemplated.

—P. J. G. PLUMMER.

WADDINGTON, F. G. (1945.) An experiment to test infectivity of cattle which are reacting to Kenya attenuated rinderpest goat virus.—*Vet. Rec.* 57. 479-480. 581

To test the infectivity of cattle reacting to attenuated rinderpest goat virus, nasal washings, urine and filtrate from an emulsion of faeces from two reacting animals were inoculated subcutaneously or given as a drench to eight oxen. Only one animal, inoculated with nasal washing, gave a temperature reaction under the test. This animal proved immune to a subsequent test with virus, the remaining seven animals proving susceptible. Four cattle kept in contact with reactors during the experiment failed to develop a febrile reaction and later proved susceptible to a virus inoculation.

It is concluded that nasal secretion from an animal reacting to goat virus will infect if injected subcutaneously, but that it does not contain a sufficiently high virus concentration to infect when given *per os*, or when cattle are kept in close contact with reactors. Passage of attenuated goat virus through oxen does not appear to increase rapidly its virulence to cattle.—U. F. R.

GREEN, R. G., & CARLSON, W. E. (1945.) The immunization of foxes and dogs to distemper with ferret-passaged virus.—*J. Amer. vet. med. Ass.* 107. 131-142. 582

Previous attempts to protect foxes against distemper by inactivated vaccines and hyperimmune serum prepared in foxes proved ineffective. It was found, however, that serial passage of the virus through

ferrets induced a progressive decline in virulence for foxes and dogs [see GREEN. (1945.) *Amer. J. Hyg.* 41. 7]. After the 50th passage, the strain could be used in an unmodified form as an immunizing agent. In a controlled experiment on a ranch where an epizootic appeared, the total mortality in a group of 8,000 pups inoculated with live vaccine was 3% (about 1.5% attributed to distemper) while in a small, unprotected group 75% died.

The modified virus was also innocuous for dogs and has been used for field trials. It produced a mild reaction and had no apparent neurotropic properties. Of 157 vaccinated dogs exposed to heavy contact infection, only eight developed symptoms, whereas 96 out of 98 controls became affected. No significant differences in the immunizing value of ferret-passaged virus of the 57th, 63rd and 69th generations respectively were observed. The intervals between vaccination and immunity tests varied from five weeks to five months. The fatalities from distemper (six) were confined to pups vaccinated 5-6 weeks before exposure to infection; all dogs vaccinated two months or more were solidly immune.—R. E. GLOVER.

EATON, M. D., MEIKLEJOHN, G., VAN HERICK, W., & COREY, M. (1945.) Studies on the etiology of primary atypical pneumonia. II. Properties of the virus isolated and propagated in chick embryos.—*J. exp. Med.* 82. 317-328. [For previous article, see *V.B.* 15. 46.] 583

EATON, M. D., VAN HERICK, W., & MEIKLEJOHN, G. (1945.) Studies on the etiology of primary atypical pneumonia. III. Specific neutralization of the virus by human serum.—*Ibid.* 329-342. 584

II. The authors studied five strains of a virus isolated from cases of primary atypical pneumonia in man by the amniotic inoculation of eggs [see *V.B.* 15. 46]. The best yields were obtained in 11-day-old embryos. Chorionic and allantoic passages were unsuccessful but virus survived in the yolk sac. The intranasal inoculation of hamsters and cotton rats with egg material produced pulmonary lesions in 59%, as compared with 2.24% in controls inoculated with normal egg fluids; serial passages failed to enhance the pathogenicity of the virus for these species.

Hamsters immunized with one of these viruses were resistant to all other strains available. The virus was still active after storage at -70°C. for 14 months. Filtration experiments gave a virus particle estimated at about 180-250 m $\mu$  in diameter.

In view of the existence of a normal neurotropic virus (P.V.H.) in hamsters, methods of controlling epizootics of the hamster disease are discussed. The new agent can be distinguished by cross-immunity experiments from P.V.H. and other virus infections found in hamsters and cotton rats.

III. The acute-phase and convalescent sera from human patients diagnosed clinically as having primary atypical pneumonia were tested for neutralizing antibodies against the virus described above by the inoculation of hamsters and cotton rats with suitable serum-virus mixtures. In 61%, a four-fold or greater increase in neutralizing antibodies was obtained; in 10%, the result was in doubt; in 29%, no increase was found. In a proportion of the patients, cold agglutinins developed sometimes before neutralizing antibodies were detected.—R. E. GLOVER.

FINLAND, M., PETERSON, O. L., ALLEN, H. E., SAMPER, B. A., BARNES, M. W., & STONE, M. B. (1945.) Cold agglutinins. I. Occurrence of cold isohemagglutinins in various conditions.—*J. clin. Invest.* 24. 451-457. 585



NLAND, M., PETERSON, O. L., ALLEN, H. E., SAMPER, B. A., & BARNES, M. W. (1945.) Cold agglutinins. II. Cold isohemagglutinins in primary atypical pneumonia of unknown etiology with a note on the occurrence of hemolytic anemia in these cases.—*Ibid.* 458-473. 586

NLAND, M., PETERSON, O. L., BARNES, M. W., & STONE, M. B. (1945.) Cold agglutinins. III. Observations on certain serological and physical features of cold agglutinins in cases of primary atypical pneumonia and of hemolytic anemia.—*Ibid.* 474-482. 587

NLAND, M., SAMPER, B. A., BARNES, M. W., & STONE, M. B. (1945.) Cold agglutinins. IV. Critical analysis of certain aspects of the method for determining cold isohemagglutinins.—*Ibid.* 483-489. 588

NLAND, M., & BARNES, M. W. (1945.) Cold agglutinins. V. Deterioration of cold isohemagglutinins on storage.—*Ibid.* 490-496. 589

NLAND, M., SAMPER, B. A., & BARNES, M. W. (1945.) Cold agglutinins. VI. Agglutinins for an indifferent streptococcus in primary atypical pneumonia and in other conditions and their relation to cold isohemagglutinins.—*Ibid.* 497-502. 590

I. The cold agglutination test [see TURNER *et al.* *V. B.* 13. 388] was applied to 200 samples of serum suspected cases of primary atypical pneumonia and 888 from a variety of diseases, particularly those of the respiratory tract. In the former group, 68.5% had maximum titre of 1:40 or over; in the latter, only 3% reached or exceeded a titre of 1:40 and most of these were cases of haemolytic anaemia. In view of these findings, it is considered that the development of cold agglutinins is of considerable diagnostic significance.

II. The cases of primary atypical pneumonia mentioned in I are analysed in detail with special reference to the relation of the titre of cold agglutinins to the severity of the disease, the extent of pulmonary lesions and the height and duration of the fever.

III. In routine tests, group O cells were used. In these experiments, high titre sera were adsorbed on AB cells which removed all group-specific isohemagglutinins; the treatment failed to affect the cold agglutinin titres. The reversible cold haemagglutinin on human cells was quite independent of haemolysin and was not affected by heating to 56°C. for half an hour.

In addition to human O cells, all the sera were positive to rabbit, cat, dog and rat cells, almost all acted with pig, sheep and horse cells and about half with fowl and monkey cells. Rabbit cells showed the longest agglutination. Some adsorbing agents such as Fuller's earth and kaolin removed all the antibodies whilst others were ineffective. Caution must therefore be exercised in the use of filters for sterilizing human sera.

IV. The factors influencing slight variations, observed when the same sera were tested on different occasions, were studied. An appreciable number of sera which were insensitive to fresh cells became sensitive with aged suspensions (3-4 days). With regard to the cells from different donors, variations noted with fresh suspensions disappeared after the cells had been stored at a low temperature. Sharp end-points were associated with high titres and with strong agglutination.

V. Some deterioration in the titre of cold agglutinins was noted after storage at low temperature, the effect being generally most marked in samples with an initially high value. The factors influencing loss in antibodies are discussed.

VI. Two strains of streptococci isolated from the sputa of patients affected with primary atypical pneumonia were agglutinated more readily by the majority of sera from patients suffering from this disease than by sera from various other cases of respiratory affections. As the streptococci in question are not regarded as playing any appreciable role in the causation of the disease, the significance of this finding is somewhat obscure.—R. E. GLOVER.

— (1945.) Discussion on the control of rickettsial infections. [Speakers: STUART-HARRIS, C. H., CARMICHAEL, J., LEWTHWAITE, R., FULTON, F., FELIX, A., FOX, L. A., LONGLEY, E. O., & HOLE, N.] —*Proc. R. Soc. Med.* 38. 511-518. 591

Typhus control depends on attack on the vector, on early diagnosis and isolation of human cases as these constitute the reservoir of infection, and on immunization by rickettsial vaccines. Though derris, pyrethrum and thiocyanate preparations proved effective in louse destruction, they did not possess the power of persistence which D.D.T. possesses to an outstanding degree. Rickettsial agglutination and complement-fixation tests are now of established value in tracing epidemiology, but they have not displaced the Weil-Felix test in respect of early diagnosis.

Laboratory experience indicates that immunization with yolk-sac or mouse-lung vaccines decreases the severity of typhus attacks and reduces mortality, and field observations suggest that it also reduces the incidence. The control of scrub typhus has been directed to rat destruction, anti-mite measures, in connexion with which certain mite poisons are now in field use, chemotherapy and serum therapy, so far unsuccessfully, and prophylactic vaccination, in which it is claimed progress has been greatly speeded.

With regard to infections of animals, CARMICHAEL discussed heartwater, for which he said vaccines, sera and chemotherapy had not proved successful [ulceron has been claimed as curative—see *V. B.* 10. 958] and dog typhus which may be transmissible to man. LONGLEY recorded observations on a disease of dogs in Nigeria which exhibited symptoms resembling a rickettsiosis, and described his own experience of an attack of typhus following the bite of a tick, which was thought to have originated from a dog.—U. F. R.

GREIFF, D., & PINKERTON, H. (1945.) Effect of enzyme inhibitors and activators on the multiplication of typhus rickettsiae. II. Temperature, potassium cyanide, and toluidine blue.—*J. exp. Med.* 82. 193-206. [For part I, see *V. B.* 15. 311.] 592

Having found that, in transferring rickettsial infections from one series of eggs to another, the reduction of the emulsifying time to 10 sec. resulted in earlier and heavier infections and that the organisms developed better in certain strains of eggs than in others, the authors tested the effect of temperature, potassium cyanide and toluidine blue on the rapidity and luxuriance of rickettsial multiplication in eggs.

Temperatures of 35°C. were more favourable to development than higher ones, and 40°C. almost entirely suppressed rickettsial growth. Toluidine blue decreased development, whilst potassium cyanide increased it. Potassium cyanide counteracted the retarding effect of high temperatures, but did not affect the depressing action of toluidine blue.

The inability of rickettsia to multiply freely in eggs kept at 40°C. is probably due to the increased activity of the endodermal cells; potassium cyanide stimulates growth by decreasing the metabolic rate of these cells, probably by the inhibition of the cyanide-

sensitive respiratory enzymes, particularly cytochrome oxidase. Toluidine blue, like other dyes of the same class, apparently furnishes a supplementary route for

oxidation, thus stimulating the metabolism of the host cells, but this route does not depend on the enzymes, and is not cyanide-sensitive.—U. F. RICHARDSON.

See also absts. 663 (cytochrome oxidase and virus resistance), 720-722 (treatment of virus diseases), 751 (influenza virus), 755 (African horse sickness), 764 (equine encephalomyelitis in the U.S.A.), 750 (rickettsia).

## IMMUNITY

HARMS, F. (1942). Der Wert der Muttertierimpfung für die Bekämpfung der Jungtierkrankheiten. [Value of inoculation of the dam for the prevention of disease in young animals.]—*Dtsch. tierärztl. Wschr.* 50. 408-412. 593

The prevention of disease in young animals can be effected either by hygienic methods or specific inoculation, or both. H. deals particularly with immunity conferred on the newborn animal by the inoculation of the dam. Immunity can be conferred either *via* the placenta or *via* the colostrum. Active transplacental immunization, in which the foetus would produce its own antibodies as a result of the antigens passing through the placenta of the mother, is not possible; the foetus is not capable of antibody production. Passive transplacental immunization is dependent upon the physiology of the dam. GROSSER distinguished four groups of mammal according to the histological structure of the placenta. Group 1 includes the horse, pig, ass, cow, goat, tapir and camel, all of which possess the placenta epithelio-chorialis, having all seven membranes fully developed. Group 2, including the sheep and deer, has the placenta syndesmo-chorialis, with only five layers of connective tissue between the maternal and foetal blood streams. Group 3, including the dog, cat, wolf and jackal, has the placenta endothelio-chorialis, with only four dividing membranes. Group 4, including man, rats, mice and g. pigs, has developed no maternal membranes; the maternal blood passes direct

to the chorial epithelium. The first group allows of no transplacental immunity; the membranes act as a filter and prevent the passage of antibodies. The fourth group, in contrast, has no such filter; antibodies can pass direct to the foetus. The second and third groups are capable of giving transplacental immunity to a limited degree. In the case of the mare and foal, with which H. is most concerned, transplacental immunity must therefore be discounted; immunity can be transferred only after birth. There can be no inherited immunity, but at the most only a certain degree of resistance.

Antibodies are conveyed in the milk only as long as it retains its colostrum character. On the day after birth, the antibody content is high but is lower after the first sucking. After the first 36 hours or so, however, changes which take place in the intestinal tract of the young animal prevent the absorption of the antibodies ingested in the colostrum. Resistance acquired by the young animal in this way is only passive and cannot last more than 10-14 days. Inoculation of the dam is therefore of no value in protecting the newly born against infections contracted after 14 days.

In practice, results of inoculation of the dam vary considerably. Some authors report infection in the young in spite of active immunization of the dam. Further co-ordination between research workers and general practitioners is essential before the problem can be solved adequately.

See also absts. 555 (immunization against TB.), 578 (against swine influenza), 564, 565 (against brucellosis), 590 (against E.I.A.), 591 (against rinderpest), 582 (against dog and fox distemper), 621 (against avian lymphoid tumour), 624 (against fowl leucosis complex), 585-590 (cold agglutinins), 660 (Rh factor).

## PARASITES IN RELATION TO DISEASE [GENERAL]

TOUMANOFF, C. (1940). A propos de la "dégénérescence brune" des microfilaires chez les moustiques, sa nature; analogie avec les "black spores" de Ross. [The "brown degeneration" of microfilaria in mosquitoes: its nature and analogy with Ross "black spores".]—*Bull. Soc. Path. exot.* 33. 372-377. 594

The supposition is rebutted that the brown degeneration of *Dirofilaria immitis* in the Malpighian tubes of mosquitoes is due to chitinization, and it is suggested that the brown pigmentation is due to melanin, as it agrees with melanin in being soluble in alkaline solutions but not in acids, and it does not give the iodine reaction of chitin.

It is suggested that the black degeneration of malarial sporocysts or sporozoites is also due to the formation of melanin, the insolubility of the black pigment in alkali being explained by supposing it to be a combination of melanin and chromolipoids. The

location of these pigmented degenerations in the neighbourhood of the trachea of the mosquito is due to the necessity of oxygen for melanin formation.—U. F. R.

DE MEILLON, B., & LAVOPIERRE, M. (1944.) South African "creeping eruption".—*S. Afr. med. j.* 18. 115-116. 595

The object of this note is to show that "creeping eruption" or "sandworm" in human beings in South Africa can be caused by the larvae of dog hookworms. A typical case of "creeping eruption" was produced in a volunteer by larvae of *Ancylostoma* sp. from the faeces of dogs from an area in Natal where the disease occurs. It is considered improbable that the mites found in natural cases in South Africa by MURRAY [(1939.) *Brit. med. j.* May 20th. 1939.] caused the lesions described; they were probably secondary invaders. There may, however, be other organisms capable of producing the condition.—E. M. ROBINSON.

## PARASITES IN RELATION TO DISEASE [ARTHROPODS]

BLANC, G., & BALTAZARD, M. (1944.) Contribution à l'étude du comportement des microbes pathogènes chez les insectes hématophages. [Behaviour of pathogenic bacteria in blood-sucking insects.]—*Arch. Inst. Pasteur Maroc.* 3. 21-49. 596

Rat fleas (*Xenopsylla cheopis*) fed on animals infected with *Pasteurella pseudotuberculosis rodentium* developed a gut infection and their faeces contained the bacilli up to 35 days after the infective feed. Emulsions of the fleas were also infective to g. pigs. The bite of these



fleas only resulted in infection in one g. pig and in this animal the organism which developed appeared to be *Past. pestis*. It is suggested that the animal must have harboured *Past. pestis* when put on experiment, but this was the only time this organism has been encountered in g. pig stocks.

*Salmonella cholerae-suis* was shown to multiply in the gut of the rat flea and to be passed out with the faeces, in which it could survive for at least a year. A flea which had fed on an infected animal could also transmit infection by the bite. The organism could also survive in *Aedes*, and was again transmissible by bite.

*S. paratyphi-B* developed in the gut of rat fleas fed on infected animals and was proved capable of surviving in fleas for 47 days, but the infection of g. pigs by the bite could not be demonstrated. This failure might be due to the slight susceptibility of the g. pig to the bacillus.—U. F. RICHARDSON.

ANDREWS, J. S., & CONNELLY, J. W. (1944.) Lesions associated with larvae of the blow-fly in the stomach of a pig.—*Vet. Med.* 39. 312. 597

Approximately 2,500 larvae of *Sarcophaga bullata*, a blowfly, along with a few pupae of *Musca domestica* were found in the stomach of a pig at Tifton, U.S.A. The pig was 36 weeks old when slaughtered and had started to lose weight four weeks previously. In addition to small lesions attributed to the larvae, there was a large, partially healed pyloric ulcer of unknown origin. The whole organ lacked the strong acid odour characteristic of a healthy pig stomach. The authors suggest that the larvae were taken in with food, but owing to the abnormal condition of the stomach were not digested.—J. B. CRAGG.

SHILLINGER, J. E. (1945.) Grubs in mink.—*Amer. Fur Breed.* 17. No. 11. 14 & 16. 598

Myiasis due to a species of *Wohlfahrtia* causes serious losses on mink farms. The larvae, which occur in small swellings on the skin, should be removed and the cavities injected with dilute argyrol or hydrogen peroxide. S. advises thorough screening of houses and pens as the most effective preventive measure.—J. B. C.

MCCARTHY, D. F. (1945.) Human creeping myiasis. [Correspondence].—*Brit. med. J.* July 28th. 135. 599

A case is recorded from Ireland of creeping myiasis in a boy. The patient complained of wandering pains in the shoulders, chest and arms. Two larvae were recovered, one from a small swelling on the left upper arm, the other from a similar swelling over the right scapula. They were "recognized as the larva of the warble-fly" by the local veterinarian.—J. B. CRAGG.

OTEN, E. (1944.) Massenbefall bei Schafen mit der Rachenbremse *Oestrus ovis* L. [Massive *Oestrus ovis* infestation].—*Z. Fleisch- u. Milchhyg.* 54. 121. 600

O. records a high incidence of nostril fly infestation among sheep in part of Italy. In a flock of 220 animals,

See also abstr. 573 (vectors of fowl malaria), 613 (vector of habronemiasis), 659 (*Glossina*), 724-726 (insecticides).

48 were infested. The usual degree of infestation was 4-5 larvae per sheep. The maximum number found in one animal was 28.—J. B. CRAGG.

VAN EMDEN, F. I. (1944.) A new sub-species of *Glossina* from Uganda (Diptera).—*Bull. ent. Res.* 35. 193-196. 601

In investigating the claim that *Glossina nigrofusca*, a West African species, occurs in Uganda, the author concludes that though the external characters of the new species were entirely those of *G. fusca*, yet the characters of the male terminalia, which agree with those of *G. nigrofusca* and deviate from those of *G. fusca*, are of a very complex nature and that "it would be highly improbable that the male terminalia and the signum in the female uterus . . . should both have characters identical in *nigrofusca* and a new race of a different species".

The new subspecies *G. nigrofusca hopkinsi* differs from *G. n. nigrofusca* in the length of the ciliation of the third antennal joint. The specimens were taken in Western Uganda about 6.30 p.m., and occurred with *G. fusca congolensis* and *G. fuscipleuris*. Nearly all the specimens were males and it is suggested that the absence of females may be due to their nocturnal habits.—U. F. R.

BLOKSOM, A., & CHANDLER, A. C. (1944.) Transient paralysis due to bite of American dog tick (*Dermacentor variabilis* Say).—*Amer. J. Dis. Child.* 67. 126-127. 602

The authors report a case of tick paralysis in a child, caused by a female *Dermacentor variabilis*. The symptoms were fever and restlessness, followed two hours later by paralysis. An engorged tick was found firmly adherent to the scalp and was removed. At that time the child's temperature was 101°F. and she was unable to move her neck. Soon after removal of the tick, the temperature fell to normal and the child was able to get out of bed and felt well. Later the temperature rose to 105°F. and there was a swelling of the cervical lymph nodes of the side on which the tick had been attached. Around the place of attachment the skin was reddened and there was oozing of serum. The temperature and the swelling of the lymph nodes responded to treatment with sulphadiazine and sulphathiazole and were apparently the result of secondary infection.—M. C.

ANDERSON, C. R. (1944.) Rat mite dermatitis: acariasis caused by the tropical rat mite, *Liponyssus bacoti* Hirst, 1914.—*Arch. Derm., Chicago.* 50. 90-95. [Abst. in *Bull. Hyg., Lond.* 20. 90, copied verbatim.] 603

An acariasis originally diagnosed as scabies was found to be due to the blood-sucking tropical rat mite, *Liponyssus bacoti* Hirst, 1914. A review of the literature reveals that since 1913 cases of a similar nature have been reported. It is suggested that a dermatitis from bites of the tropical rat mite is common but often overlooked.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

WHITTEN, L. K., & BATHAM, E. J. (1945.) Some parasitic lesions causing condemnation of lamb livers.—*N.Z. J. Agric.* 70. 70-72. 604

The white spots causing condemnation of lambs' livers were shown to be caused by *Cysticercus tenuicollis* and *Echinococcus granulosus* cysts.—M. B. BUDDLE.

CHERNOV, V. N., & TIKHOMIROV, N. P. (1943.) Redkl sluchal uvelicheniya pecheni na pochve

ekhinokokkovovo porazheniya. [A rare case of liver enlargement in a cow due to hydatid cysts].—*Veterinariya, Moscow.* No. 1. p. 42. 605

A nine-year-old cow of local breed had an intermittent cough up to the day of slaughter; it had calved normally, but the milk yield was reduced by half and the general condition was poor with quickened breathing through an open mouth.



At autopsy the lungs were enlarged, congested and thickened in part, and contained numerous hydatid cysts, weight 13.5 kg. The liver was enlarged 5-6 times, length 90 cm., width 57.5 cm., thickness 34 cm., weight 51.15 kg., and the contours were smoothed out; there were 341 hydatid cysts on the surface. On section, the parenchyma was found to be atrophied and formed a thin film between the cysts, the connective tissue being much overgrown. The capsule of the right kidney had become adherent to the liver.—E. CHERKES.

DESPORTES, C. (1944-45.) Sur *Strongyloides stercoralis* (Bavay 1876) et sur les *Strongyloides* de primates. [*Strongyloides stercoralis* and *Strongyloides* of primates.]—*Ann. Parasit. hum. comp.* 20. 160-190. 606

Nematodes of the genus *Strongyloides*, obtained from gibbons which died as a result of infestation acquired from chimpanzees, were studied in detail. Both morphological and life-history studies were made and artificial infestations were set up in dogs and cats. Attempts to infect mice, rats and g. pigs were unsuccessful except in the case of one rat. A human being became infected and a full account is given of the clinical observations on this case.

The systematics of the genus *Strongyloides* are discussed briefly and it is concluded that the parasite which the gibbons were carrying was *S. stercoralis*; the chimpanzee is recorded as a new host for this parasite.

—T. E. GIBSON.

MOREHOUSE, N. F. (1944.) Life cycle of *Capillaria caudinflata* a nematode parasite of the common fowl.—*Iowa St. Coll. J. Sci.* 18. 217-253. 607

M. recorded *C. caudinflata* in fowls in the U.S.A. for the first time in 1938 and now reports the results of his study of the geographical distribution, life-history, and transmission of this species. The literature on the taxonomy is reviewed and M. concludes that capillarids formerly referred to as *Trichosoma longicolle* Rudolphi and by other synonyms are *C. caudinflata*. M. considers that the worms from the grouse (*Lagopus scoticus*) identified in England by SHIPLEY in 1909 as *T. longicolle*, probably also the *C. longicollis* described in England by MORGAN (1932) from the domestic fowl and by CLAPHAM (1935) from pheasants, all belong to the species *C. caudinflata*. In the U.S.A., M. has collected the species from 11 states. Direct transmission by feeding embryonated eggs was not possible. Earthworms of the species *Helodrilus caliginosus* were proved to be true intermediate hosts. Attempts were unsuccessful to utilize grasshoppers, beetles, flies, ants, and isopods as intermediate hosts. The life-cycle required 42-45 days. A turkey and three English sparrows as well as chickens were infected by feeding with infested earthworms. Attempts to infect a pigeon and a duck were unsuccessful. It was found that the filtered digest of earthworms caused the embryonated eggs of *C. caudinflata* to hatch within a few minutes. This technique proved useful in determining the viability or otherwise of eggs.—M. C.

WRIGHT, W. H., KERR, K. B., & JACOBS, L. (1943.) [Studies on trichinosis.] XV. Summary of the findings of *Trichinella spiralis* in a random sampling and other samplings of the population of the United States.—*Publ. Hlth Rep., Wash.* 58. 1293-1313. [For previous parts, see V. B. 12. 499.] 608

A comprehensive survey was carried out on the incidence of trichinosis in the U.S.A. by examination of 5,313 diaphragms of cadavers in 37 states and the District of Columbia. 16.7% of diaphragms contained the larvae of *T. spiralis*. About 12% of the diaphragms examined came from rural areas. The figures showed

no significant differences in the percentage of positives for any particular state or any differences between the urban and rural population. They showed, however, that the incidence among the Jews of New York City was only 0.5% in 200 cases examined. 4.5% of the positive cases had infections of a degree which the authors believe to be capable of causing pronounced clinical symptoms.

The method of examination was both by direct microscopic examination of the compressed diaphragm and by the digestion-Baermann technique. The results showed that either method used alone would have permitted a large number of positive cases to pass unnoticed. For the detection of dead larvae the compression method was more efficient, while for the detection of living larvae the digestion-Baermann method was more efficient.—J. F. A. SPRENT.

WRIGHT, W. H., JACOBS, L., & WALTON, A. C. (1944.) Studies on trichinosis. XVI. Epidemiological considerations based on the examination for trichinae of 5,313 diaphragms from 189 hospitals in 37 states and the District of Columbia.—*Publ. Hlth Rep., Wash.* 59. 669-681. [For previous parts, see preceding abst.] 609

The examination showed that trichinosis is nearly uniformly spread throughout the country regardless of geographical or environmental factors, and that there is no correlation between *Trichinella* infection and sex, occupation, mental health, urban or rural residence, social-economic status, etc. There is, however, some evidence of a higher rate of infection (28.7%) amongst individuals of German and Italian extraction whereas the infection rate in other foreigners (15.6%) was not significantly different from that for the 5,313 individuals as a whole; only 2.1% of Jews were infected. The peak of incidence was reached in the age group 65-74 years, although it probably would have fallen in the group over 75 years of age had that group been adequately represented in the survey. Of the 855 positive cases, 28.7% had infections with living larvae, 16.6% had infections with mixed living and dead larvae, and 54.7% had infections with dead larvae. The larvae may be very long-lived but the finding of dead larvae in 3 or 4 cases in the age group 5-9 years indicates that at least some die and undergo calcification quickly. It is pointed out that the evidence obtained shows the need for handling the trichinosis problem on a nationwide scale either through concerted action on the part of the individual states or by assumption of control by the Federal government.—J. N. OLDHAM.

TURK, R. D. (1945.) Trichostrongylosis of sheep and goats.—*N. Amer. Vet.* 26. 474-476. 610

T. gives a general account of trichostrongylosis in sheep and goats, pointing out that it has only relatively recently been considered a serious disease. He states that unlike the embryonated eggs of *Haemonchus contortus*, those of *Trichostrongylus* spp. are very resistant to drying and may remain alive for many months. As under natural conditions there is usually sufficient moisture present for the eggs to reach the embryonated stage, such eggs may accumulate on the pastures during a dry spell and be responsible for heavy infestation in animals when wet conditions return. Examples are given where this has occurred.

The symptoms shown in trichostrongylosis are frequently indefinite, and faecal examination may reveal only a comparatively small number of eggs since *Trichostrongylus* spp. are not prolific egg-layers. In making a diagnosis P.M., careful examination should be made of both the abomasum and the first 20 feet of the small intestine.



Adequate nutrition is essential for control of the disease, anthelmintic treatment also being applied. A 1:10 phenothiazine-salt mixture is recommended to prevent sheep building up a heavy load of parasites, but it is stated that such treatment is ineffective in removing parasites from heavily infested sheep. Treatments that no anthelmintic has shown high efficiency against the small trichostrongyles in adequately controlled tests, and he therefore stresses the importance in control of the disease of adequate nutrition combined with the removal of lambs from sources of infection.

—T. E. GIBSON.

JONES, M. F., & HOLLAENDER, A. (1944). Effect of long ultraviolet and near visible radiation on the eggs of the nematodes *Enterobius vermicularis* and *Ascaris lumbricoides*.—*J. Parasit.* 30. 26-33. 611

High-intensity radiation in the range 3,500-4,900 Å as obtained from a high pressure, mercury vapour lamp. This corresponds to the long ultraviolet and near visible range and therefore covers a different range from the short ultraviolet radiation (below 3,000 Å) the effects of which on *E. vermicularis* were studied in similar previous experiments (Hollaender *et al.*, 1940). Infective eggs of *Enterobius*, and one-celled stages of *Ascaris* eggs, or occasionally late-segmentation or embryonated stages, were irradiated for varying periods of time in a single layer in dishes, either in distilled water or dry. For *Enterobius* the criterion of survival was subsequent ability to hatch in artificial digestive juice, for one-celled and late-segmentation stages of *Ascaris* the subsequent ability to complete embryonation at 30°C., while for embryonated *Ascaris* eggs the activity of the vermiform embryo at 37°C. was studied. This last type of criterion was not considered very reliable.

The results show that a very great amount of energy was required to produce a damaging effect in the range of radiation wavelengths used, *e.g.*, for *Enterobius*, roughly 1,000 times the lethal amount at wavelengths below 3,000 Å. Experiments with *Enterobius* showed that there was lowered resistance to radiation damage at higher temperatures. Consequently sunlight, although lacking in ultraviolet radiation of low wavelengths, should be lethal for nematode eggs after adequate time of exposure, since the region of the spectrum used in these experiments is quite intense in sunlight, and the infra-red rays present in sunlight could raise the temperature.—D. G. GILMOUR.

HELMING, C. (1944). Starker Askaridenbefall mit tödlichem Ausgang bei einem zweijährigen Kaltblutfohlen. [Fatal ascariid infestation in a two-year-old

horse].—*Berl. Münch. tierärztl. Wschr.* [Wien. tierärztl. Mschr. Jan. 7th. 9. 1944] 612

A two-year-old horse brought into B.'s clinic in very poor condition and with a very poor appetite was found to have an aneurysm the size of a goose egg on the anterior mesenteric artery. The tuberculin test, applied conjunctivally and intradermally, was negative. The faeces were found by an enrichment technique to contain 8-8 ascaris eggs and 0-5 strongyle eggs per loopful. The case was diagnosed as ascariasis, the symptoms being caused by ascaris toxin in addition to the mechanical damage caused by the worms and by the larvae wandering through the lung. The case was regarded as incurable, but at the owner's request, 40 ml. "Tetraspezial" in 2 l. of water were administered by stomach tube. The next day the foal was so weak that it could not stand and it died during the day.

At P.M. examination, 675 *Parascaris* were found, 427 in the small intestine and 248 in the caecum, all of which were already dead and were being digested by the gastric juice. Cirrhosis observed in the liver was considered to be due to the effects of ascaris toxin. From the P.M. findings it was considered that the foal died, not from the toxic effects of the anthelmintic, but from the large quantities of ascaris toxin liberated by the action of the digestive enzymes on the worms killed by the anthelmintic. It is suggested, therefore, that divided doses of the drug, rather than a single full dose, should be given to weak animals suspected of carrying heavy *Parascaris* infestations.—T. E. GIBSON.

MELLO, M. J., & CUOCOLO, R. (1943). Alguns aspectos das relações do "Habronema muscae (Carter, 1861)" com a mosca doméstica. [Relationship between *Habronema muscae* and the housefly].—*Arq. Inst. biol.*, S. Paulo. 14. 227-234. [English summary.] 613

*Habronema* larvae were obtained from an infested horse whose faeces were exposed to *Musca domestica*. Five series of experiments were carried out to determine the time and mode of entry of the helminth into the fly. The *Habronema* larvae were transferred to pig faeces. They did not penetrate the eggs of the fly, nor fly larvae within 24 hours of their hatching. Fly larvae became infested to the greatest degree on the second day after emergence from the egg. Third-day larvae were capable of infestation but to a less extent. Horse faeces proved a source of *Habronema* larvae for a period up to nine days. The distribution of the helminths in larval, pupal and adult flies was examined. In the adult fly, the worms were found largely in the abdomen on the first day, whilst from the third day they were all located in the head.—K. J. SINCLAIR.

*e also absts.* 594 (*Dirofilaria immitis*), 595 (dog hookworms), 727-731 (anthelmintics), 733 (habronemiasis in horses), 752 (trichinosis), 764 (cases from helminths in the U.S.A.).

## SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

ANDERVONT, H. B., & BRYAN, W. R. (1944). Properties of the mouse mammary-tumor agent.—*J. nat. Cancer Inst.* 5. 143-149. [Authors' summary copied verbatim.] 614

Studies on the characteristic of the mouse mammary-tumor agent yielded to the following results when strain C or I × C3H hybrid females 7 to 14 days old were used as test animals for determining the presence of the agent, and strain C3H mice were used as recipients. The agent was inactivated in mouse milk kept at 61° or 66°C. for 30 minutes and in mammary-tumor extracts kept at 56° or 66° for 30 minutes; it survived for 2 weeks in mouse milk kept at 8°. The

agent was not demonstrable in whole tumors kept for 80 days in a 50 percent saline-glycerin solution at 8°. It was filterable through Berkefeld N filters. A tumor extract administered intraperitoneally or orally to litter mates induced many tumors in those receiving the agent intraperitoneally and few tumors in those forcibly fed. Mice of unknown ancestry developed mammary tumors after sucking strain C3H foster mothers. The agent evoked tumors in mice which were not derived from inbred strains. Crude or partially purified and concentrated mouse-tumor extracts elicited neutralizing antibodies when injected intraperitoneally into rabbits. These antibodies neutralized the agent in vitro and in vivo.

ANDERVONT, H. B. (1945.) Fate of the C3H milk influence in mice of strain C and C57 black.—*J. nat. Cancer Inst.* 5. 383-390. [Author's summary copied verbatim.] 615

Five litters of low-mammary-tumor-strain C mice were suckled by high-mammary-tumor-strain C3H females. Every strain C mouse transmitted the influence to her offspring, and this transmission continued for nine generations of inbreeding. Each generation showed a high incidence of mammary tumors in breeding females. Two lines are now in the  $F_{11}$  generation of inbreeding and continue to show a high tumor incidence. A single exposure of C mice to C3H milk influence transformed strain C into a high-mammary-tumor strain.

One litter of low-mammary-tumor strain C57 black mice was suckled by a C3H female. The fostered C57 black animals transmitted the influence to their offspring in sufficient amounts to produce mammary tumors in susceptible  $I \times C3H$  hybrids; but only one of nine C57 black offspring developed a tumor, and none transmitted sufficient influence in her milk to produce tumors in  $I \times C3H$  hybrids. Two additional generations of C57 black animals also failed to show any evidence of transmission of the influence.

Apparently the genetic constitution of inbred mice determines not only their susceptibility to the influence but also their ability to transmit or propagate the influence.

ANDERVONT, H. B. (1945.) Relation of milk influence to mammary tumors of hybrid mice.—*J. nat. Cancer Inst.* 5. 391-395. [Author's summary copied verbatim.] 616

Nineteen strain C female mice were bred to strain C3H males. Of 75 ( $C \times C3H$ ) $F_1$  females born to these matings, 39, or 52 per cent, developed typical mammary tumors. Of 36 ( $I \times C3H$ ) $F_1$  females suckled by the strain C females, only 1 developed a typical mammary tumor. Extracts prepared from 5 tumors arising in ( $C \times C3H$ ) $F_1$  hybrids were fed to 55 young ( $I \times C3H$ ) $F_1$  mice, and none developed a tumor. An extract of 6 other tumors occurring in ( $C \times C3H$ ) $F_1$  mice was concentrated 12-5 times by means of the ultracentrifuge and was fed to 12 young ( $I \times C3H$ ) $F_1$  hybrids and 11 young C mice, and none developed a tumor. The results show that mammary tumors arose in hybrid mice derived from strain C females and strain C3H males and suggest but do not prove that a milk influence was not involved in the occurrence of the tumors.

ANDERVONT, H. B. (1945.) Susceptibility of young and of adult mice to the mammary-tumor agent.—*J. nat. Cancer Inst.* 5. 397-401. [Author's summary copied verbatim.] 617

Young susceptible ( $I \times C3H$ ) $F_1$  hybrid mice received cutaneous implants of tissue from spontaneous mammary tumors occurring in mice which were infected with the mouse mammary-tumor agent. The transplants grew in all the mice and remained in them from 26 to 53 days when they were removed. Of 23 mice that grew the implanted tumors, 1 developed a spontaneous mammary tumor in later life. Apparently cutaneous growth of tumor cells is not an effective means of infecting these young susceptible mice with the mammary-tumor agent.

Adult female mice of resistant strain I and susceptible ( $I \times C3H$ ) $F_1$  hybrid derivation were given a single subcutaneous or intraperitoneal injection of 0.5 cc. of mammary tumor extract. They were then mated to appropriate males, and the female offspring were kept. Of 25 ( $I \times C3H$ ) $F_1$  females, 2 developed mammary tumor. Twenty-one nursed female progeny, and 7

raised 40 mice, of which 25 developed mammary tumors, whereas 14 raised 75 mice, none of which became tumorous. None of 13 strain I females developed a tumor, and none of their 69 ( $I \times C3H$ ) $F_1$  progeny did so.

The results indicate that some of the susceptible ( $I \times C3H$ ) $F_1$  adults became infected with the mammary-tumor agent and transmitted it in their milk, whereas none of the resistant strain I adults became infected.

DERINGER, M. K., HESTON, W. E., & ANDERVONT, H. B. (1945.) Estrus in virgin strain C3H (high tumor) and virgin strain A (low tumor) mice and in the reciprocal ( $A \times C3H$ ) $F_1$  hybrids.—*J. nat. Cancer Inst.* 5. 403-405. [Authors' summary copied verbatim.] 618

The estrus cycles of inbred strain C3H and strain A mice and their reciprocal  $F_1$  hybrids were followed for a period of 150 days. The presence of a regular cycle of 4 to 5 days' duration was indicated in the four groups studied.

There was considerable variation in the age at which the vaginae opened in the different groups, the vaginae opening significantly later in strain A as compared with strain C3H and the two hybrid groups ( $A \times C3H$ ) $F_1$  and ( $C3H \times A$ ) $F_1$ .

In comparing the age at which the vaginae opened in the different groups with the mammary-tumor incidence, it was found that within these groups those in which the vaginae opened at an earlier age had a higher tumor incidence.

ESCHENBRENNER, A. B. (1945.) Induction of hepatomas in mice by repeated oral administration of chloroform, with observations on sex differences.—*J. nat. Cancer Inst.* 5. 251-255. [Author's summary copied verbatim.] 619

Chloroform was found to induce hepatomas and cirrhosis of the liver in strain A mice.

These lesions occurred after repeated oral administration only if individual doses were large enough to produce liver necrosis. The tumors could not be distinguished histologically from those induced with carbon tetrachloride. They were resistant to the necrotizing action of chloroform.

Renal necrosis occurred in male but not in female mice, while no sex difference in susceptibility to liver necrosis was observed. Doses sufficient to produce liver necrosis caused lethal kidney necrosis in male mice. Therefore, hepatomas were observed only in female mice.

Doses of chloroform that were lethal to both sexes resulted in death of the animals 24 to 48 hours after oral administration, without the appearance of the anaesthetic qualities that characterize this agent when it is given by the respiratory route.

DALTON, A. J., & PETERS, V. B. (1944.) Histologic changes in the adrenal glands of tumor-bearing mice.—*J. nat. Cancer Inst.* 5. 99-109. [Authors' summary copied verbatim.] 620

Spontaneous and induced neoplasms, both primary and transplanted, were studied in order to determine their effects upon the lipid content of the adrenal glands of the host animals. Primary tumors were found to be unsatisfactory experimental material because of the many uncontrollable variables encountered. No evidence was obtained which would suggest a specific effect of any of the tumors on the hosts carrying them. The only effect noted was a decrease in stainable lipid beginning at the inner border of the zona fasciculata and extending, in the most striking cases, to the zona glomerulosa. This lipid depletion was found to be more obvious in males than in females, partly because



the smaller amount of lipid originally present in the adrenal of the male mouse and partly because the adrenal of the male appears to be more reactive to the presence of the large amounts of tumor tissue than is that of the female. This type of depletion appears to be comparable with that resulting from moderate or excessive pituitary stimulation. The primary causes for the depletion are considered to be the formation of large areas of sterile necrosis, the presence of large masses of healthy metabolizing tumor tissue, and the presence of tissue hypoxia, e.g., in the cases of advanced generalized leukemia. The first two factors induce more obvious changes in male mice, the third is equally effective in either sex.

Whatever the primary cause of lipid depletion in the adrenal cortex, its presence suggests that some of the symptoms of the cachexia characteristic of late malignant disease may be the result of acute or chronic adrenal cortical insufficiency.

ELSON, C., JR. (1945.) The immunizing action of a lymphoid tumor in chickens.—*Amer. J. vet. Res.* 6, 103-106. 621

O. studied the immunizing action of the lymphoid tumour of the fowl, described previously [V. B. 14. 16]. A total of 172 chickens which had previously been injected with suspensions of this tumour during the first 137 passages were tested. The immunizing property of the tumour appeared to be enhanced by serial passage. Thus, during the second to the tenth passage, seven of the 24 chickens were susceptible to re-inoculation. During the tenth to thirty-sixth passages, nine of 79 chickens were susceptible. In subsequent passages, all the chickens were resistant to re-inoculation. Chickens resistant to the first inoculation were solidly resistant to re-inoculation.—F. D. A.

URMESTER, B. R. (1945.) The incidence of lymphomatosis among male and female chickens.—*Poult. Sci.* 24, 469-472. 622

A total of 1,771 pedigree White Leghorn chickens of the first population raised at the Regional Poultry Research Laboratory, U.S. Department of Agriculture, was divided into three groups. Half the chickens of each family were raised in quarantine as an uninoculated control group. Two-thirds of the remainder were injected intravenously as baby chicks with heparinized whole blood obtained from cases of lymphomatosis. The remainder were raised with the inoculated chickens as an in-contact control group. No chickens were discarded during the first 300-day period.

The incidence of lymphomatosis in the uninoculated and in-contact control groups was about twice as great amongst the females as amongst the males

of the same groups. The inoculated group did not show a significant sex difference, although the incidence was slightly higher in the females. Lymphomatosis of the ovary occurred more than three times as frequently as lymphomatosis of the testis. Group involvement did not entirely account for difference between the sexes in the uninoculated groups.—F. D. ASPLIN.

WATERS, N. F. (1945.) Lymphomatosis in chickens as influenced by diallel crossing.—*Poult. Sci.* 24, 387-390. 623

A study was made of the sire influence upon the incidence of lymphomatosis by means of diallel crossing, in which the same dam was mated to two different sires. In all, six sets of dams each consisting of 2-4 hens were employed. Each dam produced approximately ten female progeny from the first sire, after which the sires were changed. The influence of environment upon the progeny and the possibility of the dam becoming infected during the course of the experiment could not be entirely eliminated. None of the chickens were inoculated, all were reared in a mixed population of chickens in which naturally occurring lymphomatosis was present. No chickens were discarded until at least 600 days of age.

The incidence of lymphomatosis in the progeny from the first sires was 33.8% and from the second sires was 35.2%. However, when each set was analysed separately the results indicated that the progeny of one sire differed significantly from those of another when both were mated to the same dams.—F. D. ASPLIN.

JOHNSON, E. P. (1945.) Experimental vaccination for prevention of the avian leucosis complex.—*Amer. J. vet. Res.* 6, 198-203. 624

On account of the numerous difficulties encountered, very few attempts have been made to develop vaccines for the prevention of the avian leucosis complex. J. describes the preparation of several vaccines in which crystal violet and formalin were used as attenuating agents. In general, the vaccination procedure involved the intramuscular injection of formalized infective tissue suspensions, followed by the intradermal injection of a filtrate of infective material into the skin of the wattle.

Vaccinated and untreated controls were then exposed to infection by pen contact and by injection with infective material. The tests involved the use of 431 chickens, of which 282 were vaccinated and 149 were untreated. The incidence of the avian leucosis complex in vaccinated and unvaccinated chickens is tabulated. The significance of the results obtained is doubtful, but J. considers that further work along these lines is desirable.—F. D. ASPLIN.

See also absts. 628 (teratoma in a fowl), 732 (sulphonamide action of avian lymphoid tumour).

## DISEASES, GENERAL

SUMMER, P. J. G. (1945.) Studies on enzootic bovine haematuria. Effect of bovine blood on urinary bladder.—*Canad. J. comp. Med.* 9, 49-50. 625

To investigate the possibility that free blood in the bladder of cattle might be an exciting cause of hemangioma in cattle, inoculations were made into two areas of the bladder wall in groups of three, nine and one g. pigs using 0.5 ml. of whole blood, 0.5 ml. of fibrinated blood and 0.5 ml. of citrated blood, respectively, from a healthy five-month-old calf. Three livers were also each inoculated with their own blood, 0.5 ml. being injected in each instance into three separate

areas of the bladder wall. The results were negative.—J. L. BYRNE.

BRITTON, J. W. (1945.) Further observations on chronic ovine laryngitis.—*Cornell Vet.* 35, 210-213. [See also V. B. 14. 130.] 626

B. still considers that injury to the arytenoid cartilages by sharp grain-awns in the feed, resulting in chronic abscess formation and inflammatory oedema of the larynx, is the initial cause of chronic ovine laryngitis, the "incubation period" being 2-3 months. Differential diagnosis from pneumonia is described.

Treatment with sulphonamides was not successful but sodium iodide medication was promising. Surgical measures, including tracheotomy, were rendered difficult by the narrow larynx and trachea of sheep, stenosis or chronic tracheitis being the sequelae to all operations attempted.—R. ARNOLD.

KOSSMAQ. (1943.) Über Ziegenleistung, -haltung und -krankheiten.—[Goats, their value and their diseases.]—*Dtsch. tierärztl. Wschr.* [Tierärztl. Rdsch. 51/49. 213. 627

In this short general account K. mentions the great increase in the goat population in Germany during recent years, illustrating this by the rise in the number of animals from which milk samples were examined from 6,316 in 1933 to 28,925 in 1941. The average milk yield also increased and yields are now recorded of more than 2,000 kg. per year, with a total fat content of 80 kg. Mention is made of goats milking heavily for 3–4 years without being served and of one animal which gave 3 l. of milk a day and had not been served for the past eight years. In general, however, it is advisable for the animals to kid each year, the first kid being produced at about 12 months. The highest milk yield is usually reached at 5–6 years but the animals remain useful for 10 years or even longer.

The value of goats, particularly during the war, is stressed; their products include milk and butter, meat from unwanted kids 4–6 weeks old and from adult animals, skin, hair and manure.

The diseases encountered include parturition disorders (retention of the placenta, abnormal presentation), rickets and other osteodystrophic diseases, gangrenous mastitis, obstruction of the teat and digestive disorders such as tympanites and diarrhoea. Infectious diseases include foot and mouth disease, lamb dysentery and sometimes TB. K. stresses the part which the veterinarian can play in advising on breeding, hygiene and feeding, as well as on disease.—E. G. WHITE.

WICKWARE, A. B. (1945.) Case reports of relatively infrequent diseases observed at the Poultry Pathological Laboratory.—*Canad. J. comp. Med.* 9. 151–154. 628

Ulcerative enteritis or quail disease is reported in a White Leghorn pullet. A teratoma, of rare occurrence in fowl, is recorded in a White Wyandotte cockerel; although it weighed 927 g. representing 25% of the total body weight, the cockerel was well nourished. The tumour was well encapsulated and composed almost entirely of yellowish-white, cystic nodules in close apposition and varying in size from a pin head to a bean. The outer wall of each cyst was composed of bone-like tissue. Vascularity was largely confined to the capsule. Sections showed an amorphous mass of undifferentiated tissue elements resembling the tissue in the gross. The occurrence of *Pasteurella aviseptica* in a flicker (*Colaptes auratus*) is recorded. The organism proved fatal for rabbits on intraperitoneal injection and produced peritonitis in two injected pullets.—R. G.

SCHAIBLE, P. J., BURMESTER, B. R., SYKES, J. F., & THORP, F., JR. (1944.) A study of leg anomalies caused by confining chickens in small cages.—*Amer. J. Physiol.* 141. 274–280. 629

Chickens raised individually in small cages, for the purpose of investigating certain nutritional disease problems, developed leg weakness culminating in rotation of the leg bones and displacement of the Achilles tendon over the condyle. Birds reared in battery brooders or on the floor, but on the same rations were normal. It was shown that the condition was not due to nutritional deficiencies and histological studies failed to show changes characteristic of disease

atrophy. It was therefore decided to study the fatigability or capacity to do work of the muscles of birds reared under these conditions.

By a method described, the authors measured the comparative fatigability of the gastrocnemius muscle of chickens when stimulated by a tetanizing current and found that the birds raised in small cages were inferior in the capacity of their gastrocnemius muscles to perform work as compared with chickens brooded in a battery. These chicks were one day old at the commencement of the experiment and were tested at 8, 11 or 14 weeks, when the experiment was concluded. Consideration of all data suggested that the use of the small cages created a disturbance in normal muscle physiology prior to the development of gross abnormalities.

Lymphomatosis was detected by histological examination in all the groups and was therefore discounted as a causal factor of the condition. The finding of lesions in such young stock was, however, considered to be of interest.—J. D. BLAXLAND.

REID, J. T., HUFFMAN, C. F., & DUNCAN, C. W. (1945.) Poikilocytosis in dairy cattle.—*Arch. Path.* 39. 351–357. 630

The authors made a study of the occurrence of poikilocytosis in 423 cattle in a number of different herds. They observed that *in vitro* the normal shape of the bovine red blood corpuscle was a circular biconcave disc. The possibility of confusion between poikilocytes and the artefacts produced in crenation appeared to be very small. Of the 423 animals, 223 exhibited poikilocytes in the blood. The percentages of poikilocytes were as follows:—in 81, 10; in 31, 11–20; in 21, 21–30; in 13, 31–40; in 19, 41–50; in 15, 51–60; in 9, 61–70; in 12, 71–80; in 18, 81–90 and in 14, 91–100. In animals showing more than 50% of poikilocytes in the blood, the health was subnormal and one animal in which there were 35% of poikilocytes present was unthrifty. The symptoms of animals with poikilocytosis were anorexia, unthriftiness, and dry and harsh coat, and in young animals there was a retarded growth rate. Depraved appetite was often observed. The occurrence of poikilocytosis was not influenced by the calcium, inorganic phosphorus and magnesium contents of the blood, or by the haemoglobin concentration or the number and volume of the red blood cells.—T. E. GIBSON.

STONER, H. B., & GREEN, H. N. (1945.) Further observations on the adenosine equivalent of the blood of rabbits following lethal forms of tissue injury.—*J. Path. Bact.* 57. 337–343. 631

An account is given of experiments which show that in rabbits subjected to a lethal degree of trauma to the hind limbs or to a lethal degree of dehydration by hypertonic glucose solutions, there is a significant rise in the adenosine equivalent in the blood. A rise also follows fatal poisoning with cyanides. These facts support the hypothesis that a decrease in tissue oxidation leads to the release of adenosine compounds from the cells. The authors discuss the possibility that the release of adenosine triphosphate from injured tissue, followed by a more general release as progressive anoxia follows, is responsible for some of the systemic effects of local tissue damage.—T. E. GIBSON.

DUNPHY, J. E. (1944.) Shock: a consideration of its nature and treatment.—*Brit. J. Surg.* 32. 66–74. 632

D. defines shock as “a state of actual or impending peripheral circulatory failure due to a reduction of the effective blood-volume which is not primarily cardiac in origin”. It is possible to distinguish according to



the mechanism of production the three following possible types of shock: neurogenic (primary shock, nervous shock, syncope) which is a state of widespread vasodilatation without primary capillary injury; vasogenic (histamine shock, toxic shock) which is a result of direct injury to capillary walls; and haematogenic (traumatic shock, secondary shock, surgical shock, ligament shock) which is the result of a primary loss of fluid from the circulation.

D. discusses briefly each of the above types and then deals with haemoconcentration, the pulse and blood pressure in shock, capillary injury, the role of the adrenals, the theory of toxæmia and the diagnosis of shock. The principles of treatment in haematogenic shock consist in the prompt replacement of blood with blood and of plasma with plasma. There is no adequate substitute for blood or plasma. Supplying heat in the form of numerous hot-water bottles, blankets and "shock cradles" is now generally agreed to be detrimental because such measures increase the metabolism of peripheral tissues just when available blood and oxygen are needed elsewhere. It is sufficient to try to maintain body warmth by prevention of exposure rather than by application of heat.

No specific measures are as yet known for uncomplicated neurogenic or vasogenic shock. Saline may be useful to restore blood volume in neurogenic shock; the effect is temporary and the saline escapes when the vascular tone returns to normal. Saline should never be given in shock associated with capillary or tissue injury, whether general or local.—E. G. WHITE.

HAMILTON, J. I., & HAIST, R. E. (1945.) Studies on experimental shock in dogs.—*Canad. J. Res. Sect. E.* 23. 89-103. 633

A method is described for producing shock in dogs by application of pressure cuffs to the hind legs. The blood pressure rose when the cuffs were applied and remained high during the period of application. When the cuffs were removed the blood pressure fell. The average survival time of 34 dogs was 3 hours 20 min.

Among the changes noted were an increase in haematocrit value, a rise in the lactic acid concentration in the femoral vein and a rapid decrease in the oxygen content of jugular vein blood with maintenance of the arterial oxygen content until shortly before death. The plasma protein concentration usually rose, but was variable.

The intermittent application of pressure cuffs, using 20 min. periods of application with 5 min. release intervals, produced no serious effects, but with 40 min. periods of application signs of shock developed. When haemorrhage preceded the application of cuffs for the 20 min. periods, recovery usually occurred, but when the haemorrhage preceded the 40 min. periods, death resulted.

Re-application of narrow band tourniquets to the injured legs of the shocked dogs produced an increase in blood pressure and an alleviation of their condition. With compression of one leg for 10 hours the changes in total limb volume and haematocrit value were similar to those obtained when both legs were compressed for 10 hours. The dogs with one cuff applied for 10 hours survived, while those with two cuffs applied for 5 hours did not. It is felt that fluid loss alone does not account for all the changes observed in these experiments.

—P. J. G. PLUMMER.

IRISH, U., HAMILTON, J. I., HAIST, R. E., & JAKES, L. B. (1945.) The prothrombin levels of animals in shock.—*Canad. J. Res. Sect. E.* 23. 119-126. 634

Shock was produced in rats by a clamping technique

and in dogs by the application of pressure cuffs to the hind limbs. Blood samples obtained from the shocked animals tended to clot in the presence of normally adequate amounts of heparin or oxalate. The prothrombin time, plasma time, clotting time and prothrombin titre of the blood were determined before and during shock. The chief change noted in the clotting system was a more rapid activation of prothrombin in the samples from the shocked animals and from clamped controls. The cause of this change has not been established. It does not seem to be related to the activity of a proteolytic enzyme.—J. A. NELSON.

HOAGLAND, C. L., GILDER, H., & SHANK, R. E. (1945.)

The synthesis, storage and excretion of creatine, creatinine, and glycoxyamine in progressive muscular dystrophy and the effects of certain hormones on these processes.—*J. exp. Med.* 81. 423-438. 635

The diminished excretion of creatinine in progressive muscular dystrophy is a more striking and specific phenomenon than the excess of creatine. Administration of testosterone, gonadotropic hormone, thyrotropic hormone or desoxycorticosterone had no effect on the clinical course of progressive muscular dystrophy, with the exception of one case in which marked improvement followed the administration of testosterone propionate.—J. M. ROBSON.

DUNN, T. B. (1944.) Relationship of amyloid infiltration and renal disease in mice.—*J. nat. Cancer Inst.* 5. 17-28. [Author's summary copied verbatim.] 636

Spontaneous amyloidosis is of frequent occurrence in certain inbred strains of mice. In its distribution it bears a resemblance to primary or idiopathic amyloidosis of man, while experimentally produced amyloidosis in mice resembles the secondary disease of man.

Amyloid infiltration and a characteristic renal disease frequently occur together in certain inbred strains of mice. Amyloidosis of other organs may occur without the renal change, but renal change in an animal in which amyloid cannot be found is extremely rare.

Amyloid deposits in the intertubular interstitial tissue of the papilla can be identified as the earliest lesion in the renal disease of strain A mice. This condition results in occlusion of the collecting tubule and produces the urinary obstruction which is an important factor in the development of a histologic change resembling pyelonephritis of the human kidney.

"Papillonephritis" is suggested as a name for this renal disease in mice, since it emphasizes the primary injury to the papilla and does not suggest a similarity to any common nephritis of man.

SPRIGGS, D. N. (1945.) Some experiences of a sterility officer.—*Vet. Rec.* 57. 469-471 & 472. 637

In this clinical paper, S. classifies and discusses in detail the causes of absolute sterility in cattle. He mentions, in order of importance, cicatricial adhesions in the ovarian region and salpingitis, gross indurations in various parts of the genital tract (due to parturient trauma or abscess formation), long standing pyometra, advanced pyometra and genital maldevelopment and hypoplasia.

Ovarian and bursal adhesions most commonly followed purulent metritis, often after retention of the placenta. Ovarian cysts, TB. and previous rough manipulation were other causes. Cysts sometimes resulted from organization of a blood clot after normal ovulation. S. contends that even where adhesions are unilateral the chances of conception are small. He was unable to insufflate the Fallopian tubes even in normal animals, the attempt resulting in rupture of the lesser curvature of the uterus.—R. ARNOLD.

FRANCIS, T. (1945.) Studies in hereditary dwarfism in mice VIII. The histology of the anterior pituitary of mice with hereditary adiposity and of dwarf mice with hereditary adiposity.—*Acta path. microbiol. scand.* 22. 138-143. [In English.] [Author's summary copied verbatim.] 638

The anterior pituitary lobe of mice with a hereditary gene for adiposity and yellow coat is of a normal shape and size, and the anterior lobe parenchyma is normal of construction and composition. In the "fat, yellow dwarf mouse" the anterior pituitary lobe is hypoplastic,

See also absts. 640, 641 (hepato-renal syndrome), 657 (respiratory diseases of horses), 658 (anaemias in sheep), 712 (ulcerative enteritis of quail), 745 (livestock diseases in the U.S.S.R.), 764 (in the U.S.A.).

## NUTRITIONAL AND METABOLIC DISORDERS

MORRIS, H. P. (1944.) Review of the nutritive requirements of normal mice for growth, maintenance, reproduction, and lactation.—*J. nat. Cancer Inst.* 5. 115-141. [Author's summary copied verbatim.] 639

A review of the experimental work on the status of mouse nutrition reveals that in many respects the dietary requirements of the mouse and the rat are similar. The rat grows more rapidly than the mouse. The early recommendations that mice require higher protein and high salt content in their dietary for normal growth, reproduction, and lactation seem to have been predicated on the paucity of knowledge of the vitamin requirements of the species at that time. The slower growth of the mouse would suggest no greater needs for protein and salts unless these constituents were used less efficiently or because of a more intense metabolism of the mouse. The essential amino acids required by the mouse for growth appear to be similar to those required by the rat. Apparently the mouse, like the rat, is unable to grow normally and maintain normal health in the absence of unsaturated fatty acids of the linoleic or linolenic acid series.

Of the water-soluble vitamins so far studied, thiamin, riboflavin, pantothenic acid, and pyridoxine are essential for growth and maintenance of adult weight. Niacin has not been critically studied. There seems to be some doubt regarding the dietary role of inositol. Under certain conditions, it does restore growth of hair in denuded animals. There appears to be present normally in the intestinal flora microorganisms which can synthesize this material, so that while it probably is essential in the tissues, it may be formed in sufficient amounts by these organisms if the diet contains an adequate supply of the other vitamins of the B-complex, especially pantothenic acid.

The adrenal cortical hemorrhagic necrosis of the rat deficient in pantothenic acid has not been observed in pantothenic acid-deficient mice. The specific acrodynia which develops in pyridoxine-deficient rats apparently does not occur in the mouse.

The male mouse apparently unlike the male rat does not suffer from testicular degeneration in vitamin B deficiency. The female mouse, on the other hand, appears to react much like the female rat to a lack of this vitamin.

Quantitative requirements of the mouse for some of the vitamins have been determined so far as growth, maintenance of adult weight, and reproduction are concerned.

Some of the morphologic lesions resulting from some vitamin deficiencies are described.

Different pure strains of mice appear to respond in the same way to dietary deficiencies in so far as they have been studied.

and the anterior lobe tissue is defective with predominance of small pyknotic acidophiles and chromophobes, just like in the "normal dwarf mouse" with no disposition to adiposity/yellow colour. Unlike the anterior lobe of the "normal dwarf" that of the "fat, yellow dwarf" contains a few hypacidophiles and small typical acidophiles. The hypothesis is advanced that the gene for adiposity restrains the cycle and action of the pituitary lobe without causing observable morphologic changes in the anterior lobe of the normal mouse, whose cycle is stable.

CRAMPTON, E. W., & MILLS, M. F. (1945.) The effect of heating, the presence of antioxidants, and the level and melting point of the fat component on the nutritional value of diets as indicated in rat feeding tests.—*Canad. J. Res. Sect. E.* 23. 131-137. 640

Male white rats were fed baked and unbaked diets containing blended cottonseed oil and cottonseed stearin of two different melting points (45° and 57°C.) with and without the antioxidant nordihydroguaiaretic acid at a 0.1% level. The fat was incorporated into the diet at 4% and 16% concentrations. The relative nutritive value was measured by the growth of rats, the digestibility of the diet and the proportion of fat deposited in the livers and carcasses.

The 16% level was inferior to the 4% as measured by gain in weight. This may have been due to the lower concentration of carbohydrate and protein in the diet. There was no marked difference in weight gains traceable to the different melting points of the fats. There was a smaller percentage of fat in the carcasses of animals fed the high melting point fat. The digestibility of fat decreased with increase in the melting point.

The presence of an antioxidant in the fat did not affect the live weight gain, but caused a slight increase in the deposition of liver fat. This increase was statistically significant but the authors claim that it does not indicate that the antioxidant had any toxic action. Animals on a baked diet showed a greater accumulation of fat in the liver than rats on an unbaked diet, possibly caused by destruction of some of the heat-labile vitamins.—J. A. NELSON.

I. SUPPLEE, G. C., GALL, L. S., CAUL, J. F., BABCOCK, L. C., & NOHLE, E. G. (1945.) The varying requirement for choline for normal metabolism of proteins (casein, lactalbumin, and soy protein) with particular reference to the hepato-renal syndrome.—*J. Dairy Sci.* 28. 435-453. 640

II. SUPPLEE, G. C., CAUL, J. F., GALL, L. S., PRILL, E. A., BABCOCK, L. C., & NOHLE, E. G. (1945.) A comparison of choline, betaine and dimethylaminoethanol in the prevention of the hepato-renal syndrome.—*Ibid.* 455-465. 641

I. Rats maintained on a choline-deficient diet develop the hepato-renal syndrome, characterized by excessive fat deposition in the liver, increased uric acid retention and decrease in the riboflavin concentration of the kidney. The kidney lesion in young rats may develop and cause death within the first two weeks on a choline-deficient diet; the kidneys of rats surviving that initial period may recover spontaneously. For prevention of the kidney lesion and excessive deposition of liver fat, young rats require 12-15 mg. choline per day. The choline can be replaced by methionine or methionine-containing proteins such as casein.

II. Betaine was as effective as choline in promoting



the growth of young rats but not as effective in preventing degeneration of the kidney. The choline content of the liver lipoids was the same in rats maintained on either choline, betaine or dimethylaminoethanol. Dimethylaminoethanol was as effective as choline in preventing the hepatic-renal syndrome in young rats. Old animals are not as dependent on choline or betaine; the typical kidney lesion does not occur in old rats but an increase in the fat content of the liver occurs if the choline intake is low.—E. BOYLAND.

RUSSELL, F. C. (1944.) Minerals in pasture. Deficiencies and excesses in relation to animal health.

—Tech. Comm. Imp. Bur. Anim. Nutrit. No. 15. pp. 91. Bucksburn, Aberdeen: The Bureau. 8vo. 642

In a foreword, SIR JOHN ORR points out that pasture, which is the raw material of milk, meat, mutton, wool and hides, is, with the possible exception of cereals, the most important world crop. As the standard of living rises, the consumption of meat and dairy products will also rise and the importance of pasture will tend to increase.

A review of the literature dealing with the question of minerals in pasture was prepared in 1928 and a supplementary review referring mainly to investigations being carried out within the British Empire was published in the following year. These publications dealt chiefly with calcium, phosphorus, iodine and iron. Since that date much new knowledge on the subject has been obtained, particularly with regard to trace elements, deficiency or excess of which may lead to various manifestations of disease in grazing animals. R. here reviews the relevant literature.

Each chapter is devoted to a specific element or group of elements and contains a general survey and discussion of the literature, together with an account of the occurrence, signs and symptoms of the associated diseases. This is followed by a report of experimental studies and a discussion of the composition of the soil and its relationship to the composition of the pasture.

Three of the chapters deal with diseases attributed to deficiency of cobalt or copper, or to a dual deficiency of these two elements. Other chapters refer to the effects of deficiency of sodium, potassium, chlorine, iodine and magnesium. A detailed account of calcium and phosphorus deficiency is not included, since recent literature has contributed little to the information previously reviewed. The elements selenium, molybdenum and manganese, excess of which may have a toxic effect on grazing animals, are also discussed.

Each section of the chapters has a bibliography; in addition a useful list of references to reviews on various aspects of pasture research is given. Particularly valuable is the appendix containing, in tabular form, a summary of all the investigations reported.

The monograph presents the results of a large amount of research in a concise and lucid form and it should be of great value to all workers concerned with the effect of mineral deficiencies and excesses in the grazing animal. As mentioned in the foreword, it is obvious that the veterinarian must play a leading part in such investigations.—E. M. CRICKSHANK.

CUNNINGHAM, I. J. (1944.) Copper deficiency in cattle and sheep. Occurrence and control in New Zealand.—N.Z. J. Agric. 69. 559-569. 643

The existence of a natural copper deficiency in certain parts of New Zealand is described. The deficiency occurs in most reclaimed swamp areas where the soil is peaty and in some areas where the soil is a mixture of peat and pumice. The total area of peat

deposits in New Zealand comprises approximately 400,000 acres and about 250,000 acres are occupied.

The health of stock on copper-deficient country is seriously affected. Young stock are unthrifty and difficult or impossible to rear; adult stock are affected with diarrhoea and become anaemic, and production of milk and beef is greatly reduced. In lambs on such pasture there is imperfection of the nervous system which causes incoordination of gait and sometimes paralysis, while the total production of adult animals is reduced. The copper contents of liver and blood of animals grazing on deficient areas are subnormal.

The deficiency can be made good by annual applications of 5 lb. of bluestone per acre, alone or mixed with any of the usual fertilizers. After top dressing with copper sulphate there is no further occurrence of the disease in cattle or sheep and there is a marked increase in production of butter fat, lamb crop and wool.—M. B. BUDDLE.

ASKEW, H. O. (1944.) The control of cobalt deficiency at Sherry River, Nelson.—N.Z. J. Sci. Tech. Sect. A. 26. 216-222. 644

To control bush sickness in cobalt-deficient areas in New Zealand, an annual application of fertilizer to which cobalt compounds have been added, to provide the equivalent of 4 oz. of cobalt sulphate per acre is usually recommended. At Sherry River, Nelson, New Zealand, an attempt was made to determine the minimum quantities of cobalt giving satisfactory results. The results indicated that in the case of the disease in hoggets two annual applications of 2 oz. cobalt sulphate per acre gave better results than one application of 4 oz. cobalt sulphate. At the end of the first season the 4 oz. application showed a superiority over the 2 oz. application. In neither case was the effect on live-weight increase of the sheep as pronounced as with superphosphate to which cobalt compounds had been added, providing 16 oz. cobalt sulphate equivalent per acre. This treatment, even in the third season of application, showed marked improvement over the smaller amounts of cobalt sulphate.—M. B. BUDDLE.

DAVIDSON, J. L. (1945.) Calcium, phosphorus, and vitamin D in the rations of animals.—Vet. Med. 40. 276-277. 645

This is a short general article in a semi-popular vein. No new information is brought forward.—A. E.

MOREIRA, J., & FLORENCE, C. H. (1944.) Osteofibrose dos equideos no Brasil, "Cara inchada". [Osteofibrosis in equines in Brazil, "Cara inchada"].—Arq. Inst. biol., S. Paulo. 15. No. 2. 263-288. [Authors' English summary slightly amended.] 646

The increasing number of cases of osteofibrosis in horses in Sao Paulo, Brazil led the authors to study methods of controlling the disease. The disease occurs frequently in different zones with typical clinical manifestations. Untreated cases terminate in breakdown and death. On farms where the disease is prevalent the diet was composed of grain and grass and showed an imbalance in the  $\text{CaO} : \text{P}_2\text{O}_5$  ratio. The  $\text{CaO}$  and  $\text{P}_2\text{O}_5$  contents of the blood plasma of 65 healthy and 44 affected horses were studied. In healthy animals the  $\text{P}_2\text{O}_5 : \text{CaO}$  ratio averaged 4:13, varying between 3:07:10:14 and 8:88:18:89. Affected animals showed a wide variation the average being 5:07:12:22 with a variation from 8:90:14:82 to 2:89:9:80. The ratios in recovered animals fall in the same range as in healthy

The authors conclude that while estimations of the  $\text{P}_2\text{O}_5$  and  $\text{CaO}$  levels in the blood serum are of little value in diagnosis, they are useful as an indication of response to treatment.

The article is well illustrated with photographs of cases and of the X-ray appearances of the maxillae in affected and recovered horses.

GALLUP, W. D., & KUHLMAN, A. H. (1941.) Carotene content of the blood plasma of dairy cattle in relation to vitamin-A deficiency.—*Proc. Okla. Acad. Sci.* 21. 89-92. 647

A deficiency of vitamin A in the rations of dairy cattle leads to a general breakdown in health, poor growth and unsuccessful reproduction. Carotene is obtained by animals from green pasture, alfalfa and dried green hay. The absorbed carotene is converted into vitamin A by the liver. In cows only part of the absorbed carotene is changed to vitamin A, a small amount is stored in the tissues and some is secreted along with vitamin A in the milk. There is an individual as well as a breed difference in the quantitative nature of the metabolism of carotene. The level of carotene in the blood plasma of cows is indicative of carotene intake and is of importance in studying vitamin A requirements.

Experiments were made to determine the blood plasma carotene of cows receiving carotene in amounts above and below the minimum amount required for successful reproduction. Jersey cows were given prairie hay as the only source of carotene in the ration. The hay was fed at three levels, full, 50% and 25% of the normal hay allowance. The carotene content of the hay was determined at monthly intervals and that of the blood plasma was determined at monthly or more frequent intervals during complete gestation and lactation periods. Blood was drawn from the jugular vein 3-4 hours after the morning feeding and from it a petroleum ether solution of carotene was prepared and its colour compared with that of 0.02% potassium dichromate solution which was equivalent to 0.0001% solution of carotene in petroleum ether. Colorimetric determinations were checked by spectrophotometric determinations. The carotene content of the hay varied in different crops and in the loss during winter and spring storage. On the full hay ration, the average blood plasma carotene content was 250-479  $\mu$ g. per 100 ml.; on 50%, 175-201  $\mu$ g. per 100 ml.; and on 25%, 80-167  $\mu$ g. per 100 ml. Cows during lactation maintained a higher level of carotene (which did not change with advance in lactation) in the plasma than others. The level usually dropped immediately after the cows calved.

The carotene intake over extended periods was roughly proportional to the hay allowance. When the average plasma carotene was below 150  $\mu$ g. per 100 ml. the cows gave birth to weak calves. Of 11 calves produced, five died, one was dead at birth, one died on the day of birth and three died of pneumonia. The cows in this group were in poor condition after calving. When plasma carotene was maintained above 150  $\mu$ g. per 100 ml. only two of 15 calves died and one cow was in poor condition. The results emphasize the value of blood plasma carotene determinations in revealing border line deficiency of vitamin A due to low carotene intake. In pregnant Jersey cows the blood plasma carotene content must be above 150  $\mu$ g. per 100 ml. Details of analytical determinations of carotene are given and other information in table form.—E. M. J.

BRAUN, W. (1945.) Studies on the carotenoid and vitamin A levels in cattle. II. Carotenoids and vitamin A in the liver, their ratio and their relationship to blood levels.—*J. Nutrit.* 29. 73-79. [For part I, see *V. B.* 15. 333.] 648

The vitamin A value of the liver of cows maintained on pasture averaged about 250 I.U. per g., while that

of cows subsisting on a ration deficient in vitamin A and carotene was about 100 I.U. per g. In two groups of animals on these dietary regimes but receiving in addition 800,000 I.U. of vitamin A per head per week for three months, the value was of the order of 360 I.U. per g. The average values in the two latter groups did not differ significantly from each other in spite of the difference in the basal diets; it is therefore concluded that there is an optimum value for vitamin A storage in the liver. Results obtained from livers 6-8 months after cessation of vitamin A administration indicated that the effect of the supplement was not temporary. Observations on vitamin A deficient animals and on samples obtained by partial hepatectomy suggested that utilization of vitamin A reserves forces the carotenoid stores to be converted into vitamin A, so that the carotenoid level decreases before a decrease occurs in the vitamin A level. As in the case of the vitamin A: carotenoid ratios in the blood, a typical relationship was found to exist between carotenoid and vitamin A values in the liver. The vitamin A: carotenoid ratio was modified if vitamin A was fed and in certain pathological conditions. Only when the vitamin A reserves became abnormally low was there any indication of a direct relationship between these reserves and the vitamin A value of the blood.—E. M. CRUICKSHANK.

COPP, D. H., & GREENBERG, D. M. (1945.) Studies on bone fracture healing. I. Effect of vitamins A and D.—*J. Nutrit.* 29. 261-267. 649

The activity of calcification and the functional recovery in standard fractures of the fibulae were studied in rats with experimentally produced dietary deficiency. In vitamin A deficient rats, the fracture callus was smaller than normal, calcification was less active and there was a marked delay in fracture healing. In rats on a rachitogenic diet no significant calcification of the callus occurred. In animals receiving toxic doses of vitamin D, the size of the callus and the activity of calcification were much reduced and recovery in strength was delayed.—E. M. CRUICKSHANK.

STOTT, W., & HARRIS, C. C. (1945.) Synergistic effect of cod liver vitamin D on synthetic vitamin D<sub>3</sub>. [Correspondence.]—*Nature, Lond.* 155. 267. 650

When cod liver oils of varying potency were blended, the resulting potency of the blend in I.U., as estimated by rat assays, was found to agree with that obtained by calculation from the potency of the individual oils. In contrast to this, it was observed that when synthetic vitamin D<sub>3</sub> was blended with cod liver oil, the assayed potency in I.U. was higher than the calculated figure.

The synthetic forms of vitamin D are apparently individual substances, while the vitamin D of cod liver oil is known to be a complex. If the full activity of vitamin D as a therapeutic agent in rickets in rats depends on the simultaneous presence of more than one component of the complex, then synthetic vitamin D, being one substance, will show a lesser degree of antirachitic potency when administered by itself than when administered in combination with cod liver oil, which contains other members of the vitamin D complex. The authors point out that, although the synergism described between the vitamin D of cod liver oil and vitamin D<sub>3</sub> has been found to apply to experimental rickets in rats, further investigations are necessary to ascertain whether it is confined to this condition, or is of general application.—E. M. CRUICKSHANK.

KREHL, W. A., & ELVEHJEM, C. A. (1945.) The importance of "folic acid" in rations low in nicotinic acid.—*J. biol. Chem.* 158 173-179. 651

A group of puppies reared until severe deficiency



was induced on a purified ration low in nicotinic acid, responded poorly to an initial dose of nicotinic acid, lost weight and died within 2-7 days, even though nicotinic acid was again administered. Examination P.M. invariably showed a marked enteritis. A second group of puppies was fed the same basal ration, supplemented with a "folic acid" concentrate prepared from solubilized liver, until the deficiency developed. When nicotinic acid was administered, these animals gave a greater and more consistent response than the first group; they were also able to withstand repeated severe nicotinic acid deficiency. In nicotinic acid assays on dogs, therefore, it is advisable to supplement the basal ration with "folic acid". Results obtained by this method on various materials have been checked by the microbiological method and very good agreement has been obtained.—E. M. CRUICKSHANK.

— (1945.) Biotin.—*Brit. med. J.* Nov. 10th. 655.

Biotin, a member of the vitamin B complex, is necessary for the growth of many bacteria and most animals. Biotin deficiency can be induced by feeding either a deficient diet or a diet containing raw egg-white, which inactivates this vitamin, or sulphonamides. Egg-white contains a substance which combines with biotin and sulphonamides interfere with bacterial synthesis of the vitamin B complex and vitamins E and K. Biotin deficiency in monkeys is characterized by slow growing of hair and scaly dermatitis and may be prevented by administration of 20  $\mu$ g. biotin per day. Biotin deficiency in man, induced by feeding large quantities of egg white, causes anaemia and a greyish pallor and dryness of the skin progressing to a maculo-squamous dermatitis. Natural biotin is optically active

and is a dextrorotatory compound. The *dl.* (or racemic) compound has half the activity of *d*-biotin when tested on rats but is inactive in chicks.—E. BOYLAND.

KLEIN, M. (1945.) The mechanism of the virucidal action of ascorbic acid.—*Science*. 101. 587-589. 653

The virucidal action of ascorbic acid on influenza virus is due to the hydrogen peroxide formed in the oxidation of the ascorbic acid catalysed by traces of copper. Ascorbic acid has no virucidal action in the body because if hydrogen peroxide were formed it would be destroyed by catalase.—E. BOYLAND.

MULLET, R. (1944.) Etudes et recherches sur la maladie lochiale chez les grandes laitières bovines. [Research on a disorder of post-parturient high-producing cows, characterized by uterine discharge.] —*Bull. Acad. vét. Fr.* 17. 244-246. 654

M. describes a condition in high-producing cows on a high plane of nutrition occurring 6-10 days after calving and associated with a uterine discharge. Clonic spasms and convulsions occur, with disturbance of sensitivity and respiration and, frequently, a fall in milk yield; the condition is occasionally fatal.

M. differentiates the condition from milk fever because of the more violent nature of the nervous symptoms, and from lactation tetany (which it greatly resembles) because it occurs only in post-parturient animals, but no figures for blood analyses are given.

He considers that the syndrome results from hormonal imbalance, particularly of the pituitary, and claims therapeutic success with the administration of 50 I.U. of posterior lobe extract, together with 1 l. of a 10% sodium chloride solution given intravenously.

—R. ALLCROFT.

See also absts. 655, 656 (proteins), 661 (B vitamins and ascorbic acid in ruminants), 662 (liver changes in relation to diet), 669 (diet and sexual development), 678, 679 (manioc and lima beans as food), 691-694 (antibiotic action of derivatives of B vitamins), 733 (healing action of essential fatty acids), 734 (treatment of anaemia in young foxes), 735 (rickets), 658 ("pining" in sheep).

## PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

MILLER, L. L., ROBSCHT-ROBBINS, F. S., & WHIPPLE, G. H. (1945.) Hemoglobin and plasma protein. Their relation to internal body protein metabolism. —*J. exp. Med.* 81. 405-422. 655

Haemoglobin [presumably its essential protein globin], haemoglobin digest, and plasma proteins, given intraperitoneally to protein-fasting dogs are used effectively to supply the protein requirements of the body. Pigment radicles divorced from haemoglobin, given intraperitoneally, appear as surplus bile pigment even when there is an urgent need for all available nitrogenous material.—J. M. ROBSON.

ZELDIS, L. J., & ALLING, E. L. (1945.) Plasma protein metabolism—electrophoretic studies. Restoration of circulating proteins following acute depletion by plasmapheresis.—*J. exp. Med.* 81. 515-537. 656

During the first 24 hours following acute plasma protein loss in dogs, appreciable quantities of all electrophoretic components of the plasma proteins enter the circulating blood, even in starving animals. Initial albumin levels are regained more slowly than those of total globulin. The relative proportions of the electrophoretic components of plasma proteins may be disturbed from normal for 2-3 weeks after the total protein level has returned to normal.—J. M. ROBSON.

\*WITTE, J. (1942.) Die Erythrozytengrösse beim Pferde und ihre Schwankungen bei verschiedenen Erkrankungen. [Size of erythrocytes of the horse and their variations in different diseases.]—*Inaug. Diss., Berlin*. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* 51. 138-139.] 657

A total of 442 young and old animals was studied, including sick and healthy animals, stallions, mares and geldings. The average red cell diameter in the healthy horse is 5.6  $\mu$ . Age, colour and sex are without effect on red cell size. Horses more than 20 years old have an average erythrocyte diameter of 5.8  $\mu$ . In influenza and "Brüsseler Krankheit" [see V. B. 12. 580] the red cells become smaller, but regain their normal size when the animals recover. A similar change occurs in "Brustseuche" but is to be attributed to the effect of treatment with neosalvarsan since this drug has the same effect in normal animals. Only very slight alterations in red cell size occur in strangles and there are no significant changes in colic cases.—E. G. WHITE.

HOLMAN, H. H. (1944.) Studies on the haematology of sheep. II. Individual daily variation. III. Leucocytic reactions. IV. Erythrocytic and thrombocytic pictures, and variations in physical attributes. —*J. comp. Path.* 54. 179-182 & 207-219; 55. 146-157. [For part I, see V. B. 14. 353.] 658

II. H. points out that the normal ranges for the various attributes of the blood of healthy sheep are all very wide. Variations occurring in serial observations on single sheep may, however, be significant even though they fall well within the range derived from a considerable number of animals. He sets out to find the difference between consecutive samples which can be considered normal variation. He gives a table showing the daily and monthly variation in the constituents of the blood of individual sheep and the maximum admissible difference (M.A.D.) for the various

constituents; the M.A.D. (95%) is such that the difference between two readings made on the same sheep at stated intervals would not be exceeded more than once in 20 times. If the M.A.D. is exceeded the existence of some factors other than sampling and experimental errors is probable. A table of monthly and daily variations and their M.A.D. is given.

III. The leucocytic reaction to infections and irritations in sheep are described and compared with the reactions seen in human beings. Three stages are noted in the sheep, namely, the neutrophilic invasion phase, the defence phase, characterized by a decrease in the neutrophilic reaction, and the recovery phase, characterized by an increase in the number of eosinophiles. Typical reactions of this sort of different degrees of severity, produced by pyogenic organisms, are described, as also are examples of atypical reactions namely neutropenia, agranulocytosis and eosinopenia.

Abnormal variation in the leucocytes is discussed, and standards are set for different variations, the chief being as follows: marked leucocytosis 20,000 per ml.; slight leucocytosis, 13,000 per ml.; leucopenia, 4,000 per ml.; slight neutrophilic reaction, an increase of 16% in neutrophils or of 2% of band forms; slight "shift to the left", 6% of band forms; marked shift to the left and marked neutrophilic reaction, metamyelocytes constituting one-third of the neutrophilic cells; severe shift to the left and severe neutrophilic reaction, metamyelocytes constituting one-half of the neutrophilic cells; relative neutrophilia, 47% neutrophilic cells; absolute neutrophilia, 5,600 per ml.; relative neutropenia, 11% neutrophilic cells; absolute neutropenia, 700 per ml.; relative eosinophilia, 8% eosinophiles; relative and absolute eosinopenia, absence of eosinophiles in 200 cell counts on two smears made on different days. The neutrophilic cells and the eosinophiles give the most helpful guide to diagnosis and prognosis but many slight reactions may be missed unless samples are taken daily.

IV. H. discusses anaemias in sheep and suggests that classification based on aetiology is more satisfactory than classification based on alterations in the blood indexes. The anaemias are therefore classified as post-haemorrhagic, haemolytic and dyshaemopoietic. Details are given of a case of acute post-haemorrhagic anaemia produced by bleeding a sheep from the jugular vein, 3.2 l. of blood being removed in 66 hours. Stippled cells and polychromatic cells were seen as early as 48 hours after the first bleeding and the results of other workers also indicate that these are the common regeneration changes seen. They may occur when the count is as high as six millions and when once stimulated by a low count may persist and be present in blood samples when the count has reached 9.5 millions. Anisocytosis is observed but there is normally irregularity in cell size in healthy sheep; the condition is difficult to diagnose. In acute post-haemorrhagic anaemia the blood remains normochromic but in chronic post-haemorrhagic anaemia the corpuscles become hypochromic. No leucocytosis was observed but in severe anaemia there was a slight neutrophilia accompanied by disappearance of the eosinophiles.

Some details of haemolytic anaemia are given, it being in many respects similar to post-haemorrhagic anaemia, but accompanied by the liberation of blood pigment, resulting in icterus or haemoglobinuria. The dyshaemopoietic anaemias are classified as simple oligocythaemia, hypochromia, hyperchromia and aplastic anaemia. Examples of each type are discussed. There are no reports of primary polycythaemia in sheep, but erythrocytosis and relative polycythaemia (anhydraemia) have been reported. A table is given of the standards for

the classification of erythrocyte abnormalities and in addition the M.A.D. (95%) can be used to detail small changes in experimental animals. The method employed for thrombocyte counts proved too unreliable for the estimation of small changes. Changes in the shape of thrombocytes have been recorded in haemolytic anaemia and post-haemorrhagic anaemia. Thrombocytopenia has not been recorded in sheep.

Of the physical measurements, the specific gravity, sedimentation rate and viscosity showed great irregularity and were of no assistance in differential diagnosis of "pining" conditions. The M.A.D. is more useful than the normal range for the detection of small changes in fragility and coagulation time. Increase in fragility has been recorded in haemolytic anaemia and decrease in coagulation time has been produced by a lethal dose of *Clostridium welchii* Type D toxin.—T. E. GIBSON.

JACKSON, C. H. N., & VANDERPLANK, F. L. (1942.) Diameters of mammalian erythrocytes.—*Proc. zool. Soc. Lond. Ser. A. Pts. I & II.* pp. 57-60. 659

The authors measured the size of the erythrocytes of 40 different species of mammal using dried blood films, for purposes of studying the blood meals of wild tsetse flies (*Glossina*). The blood of 200 different individuals was examined, at least 100 corpuscles being measured from each individual. The results of this examination are recorded in tabular form and the authors note that in general related species have erythrocytes of about the same size. In sheep and goats the size of the erythrocytes is 3.3-5  $\mu$ . A group of primitive antelopes, hartebeest, wildebeest, etc., have erythrocytes a little larger in size, 4-4.5  $\mu$ . Next follow a heterogeneous group including cattle, buffalo and the horse family. The pig group and the rhinoceros have still larger corpuscles (6-6.5  $\mu$ ) and between these and the primates, with corpuscles of mostly over 7  $\mu$ , come the carnivora. The elephant has the largest erythrocytes (9  $\mu$ ), whilst the few rodents examined showed the erythrocytes of this group to be rather variable in size. [A large number of observations, with statistical tests, are required before conclusions as to the grouping of various species on the basis of erythrocyte size can be made. HOLMAN, for example (see preceding abst.), records the size of red blood cells in sheep as ranging from 3.5  $\mu$  to 6.0  $\mu$  in different animals, with average sizes of 4.5, 4.7 and 4.9  $\mu$  in individual animals. These average measurements class them in the primitive antelope group described by the present authors.]

—T. E. GIBSON.

UNGER, L. J., & WIENER, A. S. (1945.) Observations on sensitization to the Rh factor by blood transfusion.—*Amer. J. clin. Path.* 15. 280-285. 660

Severe reactions may arise when patients with Rh-negative bloods are transfused with Rh-positive samples. They may arise as a result of sensitization through passage of foetal blood into the maternal circulation during pregnancy, or in response to previous injections of Rh-positive samples. In many cases cross-matching tests will reveal anti-Rh<sub>0</sub> agglutinins, but occasionally high titre anti-Rh<sub>0</sub> blocking antibodies arise which mask the test. This difficulty can be avoided by the use of the slide test described by DIAMOND *et al.* (1945). Two cases of sensitization to the Rh factor are described.—R. E. GLOVER.

LUNDQUIST, N. S., & PHILLIPS, P. H. (1945.) The effect of chlorbutanol on certain members of the B complex in the rumen and blood plasma ascorbic acid levels.—*J. Dairy Sci.* 28. 25-28. 661

It has been shown that ascorbic acid is associated with reproduction in the bovine and that chlorbutanol raises the ascorbic acid level in the blood plasma. This



has led in some instances to the use of the latter in the prophylactic treatment of cattle where breeding difficulties are encountered. In view of the fact that this drug might have an influence on the synthesis of the vitamin B complex in the rumen, experiments were undertaken on a Holstein heifer with a rumen fistula. A ration of hay and silage and a grain mixture of corn, oats, linseed meal and minerals were fed. Chlorobutanol was administered, mixed with the grain ration, at the rate of 5 g. per day for 160 days. Samples of the rumen contents, taken during the pre-experimental period, during chlorobutanol feeding and again after the cessation of feeding the drug, were examined four times at 2-hourly intervals on test days. No significant effect on the synthesis of riboflavin, pantothenic acid, nicotinic acid or vitamin B<sub>1</sub> was observed. There was a definite rise in plasma ascorbic acid, and this was maintained throughout the period of administration. When the drug was removed, the plasma ascorbic acid dropped to sub-normal, and normal level and was not regained for four weeks. When subsequently the drug was fed for only three weeks, a rise in plasma ascorbic acid again occurred, but on its removal the plasma values did not fall below normal.

The heifer remained in good condition throughout the experiment and there was some increase in body weight, owing to the fact that the chlorobutanol stimulated appetite.—E. M. CRUICKSHANK.

KAPLAN, N. O., & GREENBERG, D. M. (1944.) Studies with radioactive phosphorus of the changes in the acid-soluble phosphates in the liver coincident to alterations in carbohydrate metabolism. I. Separation and nature of the organic acid-soluble phosphates of liver. II. The effect of glucose, insulin, and of certain metabolic inhibitors. III. The effect of fasting and of high fat, high carbohydrate, and high protein diets.—*J. biol. Chem.* 156. 511-524, 525-542 & 543-551. 662

I. A method is described for the estimation of the different phosphorus compounds present in liver. If liver tissue is allowed to stand with trichloroacetic acid, a slow hydrolysis of phosphatides takes place and acid-soluble phosphorus compounds are liberated.

II. Radioactive sodium phosphate (containing  $P^{32}$ ), injected into rats, reacts rapidly to form glucose-6-phosphate, while radioactive glycerophosphate is only formed slowly. If glucose is also injected, the amount of  $P^{32}$  combined in adenylyl pyrophosphate is increased without increasing the hexose phosphate concentration. The increase in radioactive adenylyl pyrophosphate is even greater if insulin is given with the glucose. The injection of fluoride causes an accumulation of hexose phosphate and reduces the rate of formation of adenylyl pyrophosphate. The experiments show that the "phosphate cycle" occurs in carbohydrate metabolism of the rat liver *in vivo*.

III. Dietetic factors affect the distribution and turnover of the phosphorus (both  $P^{32}$  and  $P^{33}$ ) compounds of the liver. The total acid-soluble phosphorus is increased in a high carbohydrate diet and injected phosphate (as indicated by the  $P^{32}$  which it contains) reacts most rapidly in carbohydrate-fed animals. The capacity to form adenylyl triphosphate in the liver is greatest in animals on high carbohydrate diets and it is suggested that the adenylyl triphosphate content of the liver determines the shape of the glucose tolerance curve.—E. BOYLAND.

HOWE, H. A., & MELLORS, R. C. (1945.) Cytochrome oxidase in normal and regenerating neurons.—*J. exp. Med.* 81. 489-500. 663

A reduction of cytochrome oxidase activity was

observed in anterior horn cells of the spinal cord which had been stimulated to regenerative activity by section of peripheral nerves. Maximum reduction coincided with maximal refractoriness of the cells to poliomyelitis virus.—J. M. ROBSON.

\*ZECHNER, H. (1942.) Über den Gehalt an Gesamtstickstoff, Aminostickstoff, und Ammoniak im Harn gesunder Pferde. [Total nitrogen, amino nitrogen and ammonia content of the urine of healthy horses.] —*Inaug. Diss., Berlin.* pp. 35. [Abst. from abst. in *Jber. Vet.-Med.* 71. 170.] 664

The results obtained from 47 samples of urine from 26 clinically healthy horses were:—total nitrogen, 0.1% (0.08-0.12%); ammonia, 4.1 mg. per 100 ml.; amino nitrogen, 13.5 mg. per 100 ml. The excretion of these substances appeared to be independent of the age, breed and sex. Some of the ammonia was combined with acids volatile in steam.—E. BOYLAND.

PERRY, E. J., & BARTLETT, J. W. (1944.) A survey of results of artificial breeding of dairy cattle in New Jersey.—*Circ. N.J. agric. Exp. Sta.* No. 489. pp. 8. 665

This circular surveys the activities of artificial insemination associations in New Jersey and details some of the problems confronting them. Some outstanding points made are the following: There was a 14% increase in pounds of fat and a 9.3% increase in pounds of milk produced by the first generation of "artificial" daughters over their dams. An average of 1.9 inseminations was required for each pregnancy. The examination of cows for pregnancy by the association's veterinarians was found to be worth while and the treatment of certain abnormal conditions was appreciated by farmers. There seemed to be general satisfaction with the service, which may however be improved when better bulls are bred or new techniques are devised.

—T. E. GIBSON.

SALISBURY, G. W., ZELAYA, J. A., & VANDEMARK, N. L. (1945.) Livability and glycolysis of bovine spermatozoa in yolk-citrate, incubated eggs or chick-embryo diluters.—*J. Anim. Sci.* 4. 270-276. 666

Two different experiments were conducted to determine the value of chick-embryo diluent of bovine semen, as compared with egg-yolk-citrate. Chick-embryo diluent made from whole, fertile eggs incubated 9-11 days was found to be only slightly superior to yolk-citrate in maintaining viability of spermatozoa during low-temperature storage. The difference was observed largely with the semen samples of poorest original quality, which would not ordinarily be used in commercial artificial insemination. In a limited trial with semen of better average quality, no difference was noted in viability during storage between yolk-citrate, chick-embryo made from whole, fertile, incubated eggs and a diluent made from the embryos only. The authors point out that the work and time required to prepare chick-embryo diluents severely limits their use for large-scale artificial breeding purposes.

Evidence was obtained during the experiments that the chick-embryo material may aid in the promotion of glycolysis by the spermatozoa.—N. J. SCORGIE.

ASDELL, S. A., DE ALBA, J., & ROBERTS, J. S. (1945.) The levels of ovarian hormones required to induce heat and other reactions in the ovariectomized cow.—*J. Anim. Sci.* 4. 277-284. 667

The average minimal dose of oestradiol benzoate required to bring ten ovariectomized heifers into heat was 600 rat units daily for three days (range 366-800 R.U.). Two heifers failed to respond to daily doses as high as 5,000 and 70,000 R.U. respectively.

The average minimal dose of stilboestrol for induction of heat was 663 R.U. or 0.255 mg. daily. The duration of heat was, in most cases, less than one day, which probably approximates to that for normal cows. Even with oestrogen dosages up to 10,000 R.U. daily, continuous heat was never observed. It is probable that this was due to an "oestrous block" occurring in the central nervous system, which set in at the comparatively low threshold of approximately 600 R.U. Mucin was discharged from the vagina at daily doses below 5,000 R.U., but it was apparently prevented at higher doses by excessive keratinization of the vaginal walls. No oestrogen was detected in the urine of oestrous cows.

The uterine muscle of ovariectomized heifers was relatively inert to pituitrin, adrenalin, lentin and arecolin. Following oestrogen injection, it reacted similarly to that of heifers in heat. Progesterone in doses of 35 rabbit units, or more, for six days produces a reaction in uterine muscle characteristic of dioestrus, while in doses of 18 rabbit units the response typical of pro-oestrus was produced. The average length of uterine muscle cells was greater in the oestrogenized heifers than in the ovariectomized controls; progesterone did not inhibit this action of oestrogen. In domestic animals the follicle-stimulating hormone content of the pituitary, length of heat period, oestrogen threshold, and urinary excretion of oestrogen appear to, run strikingly parallel in the following descending order: man, horse, pig, sheep, cow. It is suggested that the low hormone threshold in the cow may provide an explanation of the freemartin problem.—N. J. S.

BACSICH, P., & WYBURN, G. M. (1945). Induction of heat in spayed female guinea pigs by subcutaneous hormonal implants. [Correspondence.]—*Nature*, **155**, 430. 668

Oestradiol tablets (2 mg.) were implanted subcutaneously into spayed g. pigs and followed 6 or 12 days later by 0.2 mg. progesterone, the g. pigs being killed after three hours and examined. The changes found were those associated with oestrus (enlargement and oedema of the uterus, thickening of the endometrium and increased activity of the uterine glands) except for the vascularization of the antimesometrial border of the uterine cornua. This phenomenon, which according to the authors can only be produced in spayed animals by a hormone balance more closely simulating that in the normal g. pig, was achieved in mature spayed g. pigs by six preliminary daily doses of 0.0005 mg. oestradiol, followed for two days by 0.5 mg. oestradiol and then by 0.2 mg. progesterone.—R. A.

WHITE, F. R. (1944). Effect of diet upon the development of mammary glands in strain C3H mice.—*J. nat. Cancer Inst.* **5**, 49-53. [Author's summary copied verbatim.] 669

Mammary tissue of strain C3H virgin female mice fed a low cystine diet showed an absence of growth which indicated that estrus had been suppressed. Mice fed the same diet but kept in continuous estrus by a subcutaneously implanted pellet of diethylstilbestrol had mammary tissue in which considerable growth had taken place.

Mammary tissue of virgin female mice fed a diet low in lysine showed variations from very little to considerable growth, which indicated that in some of the mice estrus had occurred, while in others it had been absent.

Among the virgin female mice restricted in calories, mammary tissue showed little evidence of growth. Mammary tissue from breeding females fed the same diet was atrophied, which indicated that sexual activity had been stopped by the caloric restriction.

FRANK, A. H., SCHOTT, R. G., & SIMMONS, V. L. (1945). Response of anestrus does and ewes to pregnant mare's serum during two consecutive seasons.—*J. Anim. Sci.* **4**, 317-324. 670

During the 1942 season, 19 out of 20 goats came into oestrus following P.M.S. injections [see V.B. **14**, 245, abst. 1563], whereas in 1943, only six out of 56 responded to similar treatment. In 1942, six out of 14 ewes came into oestrus after P.M.S. treatment and all 14 ovulated [see V.B. **14**, 245, abst. 1567]; with similar treatment in 1943, only two of 26 came into oestrus, and nine of 25 ovulated. The different responses to P.M.S. treatment were not thought to be due to variations either in methods or materials. The possibility is briefly discussed that environmental or nutritional variables are involved in the divergent responses to P.M.S. administration often observed in ewes and goats and reported by a number of different authors.—N. J. SCORGIE.

GUNN, C. K. (1945). The effect of mating time upon reproduction in foxes.—*Emp. J. exp. Agric.* **13**, 193-198. 671

By means of a vaginal smear technique, G. determined with some accuracy the beginning and duration of oestrus in silver fox vixens. As a check on the method, trial tests were made with male animals, to determine whether or not the vixens would accept service. The appearance of large cornified cells among the cells of the pro-oestrous smear was regarded as indicating the beginning of oestrus, and the appearance of round clear cells (macrophages) and large numbers of leucocytes was regarded as an accurate indicator of the metoestrous phase.

The data show that from the mating of 274 vixens, 15.5% of those mated in pro-oestrus or early oestrus, as determined by the vaginal smear method, and 44.0% of those mated in late oestrus or met oestrus proved to be barren. There was no significant difference in average litter size between the early- and late-mated groups. Statistical analysis showed no significant difference in litter size when vixens were mated either in the first or the second days of heat; similarly, using the vaginal smear test, there was no real difference in litter size as between matings during pro-oestrus or during the early cornified-cell stage. The oestrous period in the fox was found to vary in duration by both test methods from 1 to 4 days, extending in exceptional cases to 5 or 6 days.—N. J. SCORGIE.

GAUNT, R., CORDESEN, M., & LILING, M. (1944). Water intoxication in relation to thyroid and adrenal function.—*Endocrinology*, **35**, 105-111. 672

Hyperthyroid rats, induced by injection of thyroxin, showed an increased diuretic response to water and a marked resistance to water intoxication. In hyperthyroidism, induced by thiourea or thiouracil, the diuretic response to water was normal and there was no increased susceptibility to water intoxication. The characteristic effects of hyperthyroidism were largely abolished by adrenalectomy.—J. M. ROBSON.

BECKS, H., SIMPSON, M. E., LI, C. H., & EVANS, H. M. (1944). Effects of adrenocorticotrophic hormone (ACTH) on the osseous system in normal rats.—*Endocrinology*, **34**, 305-310. 673

Male rats injected intraperitoneally for 30 days with pure adrenocorticotrophic hormone (ACTH) gained only half as much in body weight as did untreated controls, despite the fact that they consumed approximately the same amount of food. Both chondrogenesis and osteogenesis were greatly retarded in the treated rats; but comparisons of the reduction in width of the proximal epiphyseal cartilages of the tibiae of these



animals showed that the reduction was not as extreme as after hypophysectomy, when osteogenesis ceases completely. A comparable retardation of growth could be induced in normal rats by diminishing the food intake to about 70% of the normal; the effect of ACTH could not thus be explained on the grounds of reduced food intake.

Growth retardation and diminished osteogenesis caused by ACTH could not be reproduced in adrenalectomized rats, suggesting that the action of ACTH in normal rats occurs through the adrenal cortex.—A. E.

BECKS, H., SIMPSON, M. E., MARX, W., LI, C. H., & EVANS, H. M. (1944.) Antagonism of pituitary adrenocorticotrophic hormone (ACTH) to the action of growth hormone on the osseous system of hypophysectomized rats.—*Endocrinology*. 34. 311-316. 674

ACTH inhibited the bony change induced in hypophysectomized rats by growth hormone. The proximal epiphyseal cartilage of the tibia was greatly decreased in width, endochondral bone formation was retarded and osteoblastic as well as osteoclastic activity was greatly increased.—J. M. ROBSON.

CHAPMAN, A., HIGGINS, G. M., & MANN, F. C. (1944.) Additional studies of the extrathyroidal metabolism of iodine.—*J. Endocrinol.* 3. 392-396. 675

Young male rats (Wistar strain), initially eight weeks of age were maintained for 95 days on a basal low-iodine diet, supplemented in half the cases with iodine (as KI) in the drinking water (0.5 µg. I<sub>2</sub> per ml.). Half the animals in each group were then thyroidectomized and observations were continued for a further 126 days. From differences in growth rate and caloric output between iodine-deprived and iodine-supplemented rats in the thyroidectomized animals it was

See also absts. 618 (oestrus in inbred mice), 620 (adrenal cortical insufficiency), 635 (sex hormones), 649 (bone fracture healing), 736 (hormone therapy), 765 (text-book of histology).

concluded that inorganic iodine had been utilized by the body, possibly through formation of an iodine-protein compound. It is suggested that tissues other than the thyroid may have retained a primitive ability to utilize iodine, a conclusion which is in agreement with the independent observations of MORTON *et al.* [see V. B. 11. 26] who used radioactive iodine.

—A. N. WORDEN.

CASPE, S. (1943.) Constituents in red blood cells of value in wound healing.—*Amer. J. Pharm.* 115. 461-463. 676

Treatment of the exposed surfaces of non-healing wounds by dusting with red blood cell powder gave results indicating that it tended to quicken healing. Discarded red blood cells contain glutathione, haemoglobin, creatine and allantoin; these constituents in blood accelerate the healing of wounds. Allantoin has an effect on the creatine metabolism.—E. M. J.

DEMPSEY, E. W., & WISLOCKI, G. B. (1945.) Histochemical reactions associated with basophilia and acidophilia in the placenta and pituitary gland.—*Amer. J. Anat.* 76. 277-301. 677

The basophilic substance present in the cytoplasm of the syncytium and cytotrophoblast of the human placenta and also present in the basophilic cells of the anterior lobe of the rat pituitary was shown to be ribonucleic acid. Alkaline phosphatase is present in the outer eosinophilic margin of the syncytial trophoblast in early pregnancy and the phosphatase reaction increases during pregnancy until the entire syncytium is involved, with a corresponding decrease in basophilia. It is suggested that the phosphatase in conjunction with glycogen is responsible for the deposition of calcium in certain regions of the placenta.—J. A. NICHOLSON.

## POISONS AND POISONING

JOACHIM, A. W. R., & PANDITTESEKERE, D. G. (1944.) Investigations of the hydrocyanic acid content of manioc (*Manihot utilisima*).—*Trop. Agriculturist*. 100. 150-163. 678

The combined and total HCN content of manioc tubers and leaves was estimated by a method involving autolysis and acid hydrolysis of the material. The method of sampling was chosen with care, since considerable variations were found in HCN from clump to clump and in different parts of the tuber, the stem end being richer in HCN than the other end. Variety and environmental conditions play a larger part than age in determining the HCN content. Bitter varieties contain more HCN than sweet, and peel contains more than flesh. The autolytic enzyme "linase" is inactivated at 72°C.; drying at temperatures below this therefore leads to greater losses of HCN than drying at higher temperatures. The tubers lose HCN on cooking. There is a considerable quantity of HCN in the leaves but cooking markedly reduces it.—R. M.

CHARAVANAPAVAN, C. (1944.) Studies in manioc & lima-beans with special reference to their utilization as harmless food.—*Trop. Agriculturist*. 100. 164-168. 679

The following methods of preparation of HCN-containing material reduced the content to less than the safe level of 5 mg. HCN per 100 g. of material for feeding purposes.

Manioc tubers should be peeled, cut up, and boiled in an open vessel for one hour or peeled, sliced or rasped,

spread out for 24 hours and then dried at 60°-70°C. Manioc leaves picked young should be chopped and boiled in two changes of water.

Lima bean pods and also mature lima bean seeds may be treated similarly, but dried mature seeds should be soaked overnight in sodium carbonate solution before boiling in water.—R. MARSHALL.

KOEN, J. S., & SMITH, H. C. (1945.) An unusual case of genital involvement in swine associated with eating moldy corn.—*Vet. Med.* 40. 131-136. 680

The authors describe an outbreak of disease in a herd of 105 weaned pigs. In the gilts, the vulva was swollen, reddened and protruding and in advanced cases it was necrotic. The mammary glands and teats were not affected. In the young castrated boars the prepuce was swollen 2-3 times its normal size. Urination was not interfered with. The striking symptoms in the boars was a marked enlargement of the mammary glands and extreme enlargement and redness of the teats. The glands and teats were so large that they appeared about to secrete milk.

The pigs were on pasture and were given maize which was the previous year's crop and very mouldy. Symptoms started soon after the pigs had been weaned and given this maize. The breeding sows which were kept separate from the young pigs and were being fattened for sale were not affected. No treatment was adopted but the feeding of the mouldy maize was stopped. Marked improvement followed and two months later most of the pigs appeared normal. Two

of the most severely affected gilts, in which prolapse and necrosis of the vagina had occurred, had to be destroyed.

Literature dealing with similar outbreaks in both pigs and cattle is briefly reviewed and the suggestion is made that mouldy maize may contain some chemical agent resembling stilboestrol or ergot which is responsible for producing this condition.—M. C.

CAUTHEN, G. E. (1945.) Tests of the safety of phenothiazine for cattle.—*J. Amer. vet. med. Ass.* 107. 71-72. 681

Although widely used with satisfactory results, phenothiazine has occasionally been reported to produce toxic effects in cattle. The author made tests on 12 parasite-free calves, 6-12 months old and kept on a normal diet. A single dose of 100 g., three daily doses of 100 g., 56 daily doses of 8 g., and various similar dosages all proved non-toxic. Two 9-month-old calves, fed on an inferior diet of ground white maize and Johnson grass (*Andropogon halepensis*), did not develop anaemia when given therapeutic doses of 36 and 52 g. phenothiazine. One calf, receiving a single dose of 250 g., was off its feed and unsteady in its movements the day following treatment, but by the third day it was quite normal. Except at this extremely high dosage, phenothiazine was therefore non-toxic to the healthy animals used in the experiment.—T. E. GIBSON.

SEIFTER, J. (1944.) Liver injury in dogs exposed to trichloroethylene.—*J. industr. Hyg. Toxicol.* 26. 250-252. [Abst. in *Bull. Hyg., Lond.* 20. 87, copied *verbatim*.] 682

Liver injury developed in dogs exposed to trichloroethylene vapors. The liver injury consisted of dysfunction as measured by the bromsulfalein and chloral tests, glycogen depletion, and hydropic parenchymatous degeneration. Other signs of intoxication, which appeared coincident with the dysfunction, were anemia, loss of weight, nausea, vomiting, lethargy, and diarrhoea. All signs of intoxication cleared up in the dogs that were removed from the exposure and allowed to recuperate. The liver injury resulted in 3 weeks from an exposure intensity of 750 ppm, 7 to 8 hours daily, 6 days a week; in 8 weeks from an exposure intensity of 500-750 ppm., 4 to 6 hours daily, 5 days a week.

I. CASE, R. A. M. (1945.) Toxic effects of 2,2-bis(p-chlorophenyl) 1,1,1-trichloroethane (D.D.T.) in man.—*Brit. med. J.* Dec. 15th. 842-845. 683

II. HILL, K. R., & ROBINSON, G. (1945.) A fatal case of D.D.T. poisoning in a child. With an account of two accidental deaths in dogs.—*Ibid.* 845-847. 684

I. The possible toxic effect of the use of a distemper containing 2% D.D.T. was tested under severe conditions, on two human beings. The paint was covered with a thin film of oil, the temperature and relative humidity were high, and large skin areas of the two subjects were placed in contact with the oily surface of the distemper for 48 hours. The more important effects observed were tiredness, aching limbs, diminution of some reflexes, slight impairment of hearing and an apprehensive mental state; there was also an increase of erythrocyte destruction, a decrease in the mean corpuscular haemoglobin, an increase in reticulocytes and a diminution of polymorphonuclear neutrophile leucocytes, accompanied by the appearance

of immature white cells, and indicanuria. The return to normality took 26-33 days. C. emphasizes the danger of D.D.T. poisoning in the presence of oil and suggests that haematological examinations and urinary indoxyl sulphate estimations might be used diagnostically.

II. The authors record a fatal case of D.D.T. poisoning in a child who drank about 1 oz. of 5% D.D.T. in kerosene (lethal dose = approx. 150 mg. per kg. body weight of commercially pure D.D.T.). Coughing and vomiting occurred within 10 min., in one and a half hours the child became comatose and had convulsions, and two and a half hours later died of pulmonary oedema, probably from paralysis of the respiratory centre. Experiments on baboons proved that death was caused by the D.D.T. and not by the kerosene.

The authors also record fatal chronic D.D.T. poisoning in two bull terriers two months after spraying with 5% D.D.T. in kerosene for demodectic mange.

—JEAN P. BUXTON.

LILLIE, R. D., & SMITH, M. I. (1944.) Pathology of experimental poisoning in cats, rabbits, and rats with 2,2 bis-parachlorophenyl-1,1,1 trichloroethane.—*Publ. Hlth Rep., Wash.* 59. 979-984. [Abst. in *Bull. Hyg., Lond.* 20. 90, signed L. P. GARROD, and note by P. A. BUXTON, copied *verbatim*.] 685

This is a full catalogue of the morbid histological findings in various organs of cats, rats and rabbits poisoned with D.D.T. Although the symptoms of poisoning point to an effect on the central nervous system, the demonstrable changes here are comparatively slight. The principal effects are seen in the liver, and consist of hyaline and fatty degeneration with areas of necrosis, central and mid-zonal in distribution.

[DDT is of such immense importance that the question of its toxicity to man has been carefully looked into in the U.S.A. and Britain. I believe that men engaged in manufacture, and those who have sprayed it for long periods have been carefully examined, and no evidence of toxic action of any kind found in them. There seems to be no evidence that DDT, used as an insecticide, is harmful to man or domestic animals.]

DARDINSKI, V. J. (1945.) Erythema multiforme bullosum following the use of sulfadiazine.—*Amer. J. clin. Path.* 15. 28-30. 686

A fatal case is recorded of erythema multiforme bullosum in a girl aged 17 years following dosage with sulphadiazine. The patient was admitted to hospital with bronchopneumonia and was treated with two tablets [presumably 0.5 g. each] of sulphadiazine every four hours until 32 had been administered, followed by one every four hours for 20 more tablets. Later [interval unspecified], because of insufficient improvement, the dosage of two tablets every four hours was re-instituted for a further 36 hours. Following this, all treatment was stopped because of the appearance of a skin rash and numerous water blisters. Later the general condition of the patient deteriorated and large bullae appeared over the entire body. During the next three days these ruptured, leaving extensive raw areas. Death occurred about a week after first appearance of symptoms. The histological picture on autopsy was similar to that occurring in erythema multiforme bullosum.—D. D. OGILVIE.

## PHARMACOLOGY, THERAPEUTICS AND DISINFECTION

RAPER, K. B., ALEXANDER, D. F., & COGHILL, R. D. (1944.) Penicillin. II. Natural variation and penicillin production in *Penicillium notatum* and allied

species.—*J. Bact.* 48. 639-659. [For part I, see *V. B.* 15. 94.] 687

BENEDICT, R. G., SCHMIDT, W. H., COGHILL, R. D., &



- OLESON, A. P. (1945.) Penicillin. III. The stability of penicillin in aqueous solution.—*Ibid.* 49. 85-88.
- II. Of 241 different cultures of *Penicillium notatum chrysogenum* which were investigated, all but 24 produced measurable amounts of penicillin. Strain NRRL 1249 B21 produced almost twice as much as any other strain when grown in surface culture. About a quarter of all the strains examined produced as much penicillin as NRRL 832, generally used for the production of penicillin in submerged culture. Different strains were more effective when compared in submerged culture, PS 165, PS 176 and PS 180 being the best under such conditions.
- III. Crystalline sodium penicillin was more stable in aqueous solution at pH 2.0 and 0°C. than a partially purified solution of penicillin. The destructive process appears to be an irreversible reaction of the first order. Data are given from which it is possible to calculate the rate of destruction of pure penicillin in solution at pH 2.0 at any temperature between -10°C. and +40°C.—E. BOYLAND.
- TODD, E. W., TURNER, G. S., & DREW, L. G. W. (1945.) "Fastness" of staphylococci, haemolytic streptococci, and pneumococci to penicillin.—*Brit. med. j.* Nov. 3rd. 603-604.
- Seventy-five subcultures of two strains of staphylococci in broth containing 400 units of penicillin per ml. increased the resistance to penicillin of both strains five thousand times. This resistance was rapidly lost on subcultivation in plain broth. A strain of *Streptococcus pyogenes* had its resistance increased only four times after 78 subcultures in penicillin broth. This increased resistance was completely lost after 76 subcultures in plain broth. A strain of pneumococcus had its resistance increased 30 times after 55 subcultures in penicillin broth. This increased resistance was retained after 82 subcultures in ordinary broth.—R. M. LOOSMORE.
- COULTHARD, C. E., MICHAELIS, R., SHORT, W. F., SYKES, G., SKRIMSHIRE, G. E. H., STANDFAST, A. F. B., BIRKINSHAW, J. H., & RAISTRICK, H. (1945.) Notatin: an anti-bacterial glucoside-aerodehydrogenase from *Penicillium notatum* Westling and *Penicillium resticulosum* sp. nov.—*Biochem. j.* 39. 24-36.
- Notatin is a flavoprotein enzyme catalysing the aerobic oxidation of glucose with the production of hydrogen peroxide. Notatin inhibits the growth of *Staphylococcus aureus* when present in dilutions of one part per thousand million. The antibiotic previously isolated from *Penicillium resticulosum* is probably identical with notatin.—E. BOYLAND.
- MADINAVEITIA, J., MARTIN, A. R., ROSE, F. L., & SWAIN, G. (1945.) Antibacterial substances related to pantothenic acid.—*Biochem. j.* 39. 85-91.
- Eleven amide derivatives of pantoic acid were tested as antagonists to pantothenic acid in promoting the growth of *Lactobacillus casei*  $\epsilon$ . Pantoic acid hydrazide inhibited growth *in vitro* but had no therapeutic action on rats infected with *Streptococcus pyogenes*. One amide derivative (a *p*-aminobenzene sulphonyl compound) had a slight therapeutic action.—E. B.
- MARTIN, A. R., & ROSE, F. L. (1945.) Antibacterial activity of substances related to *p*-aminobenzoic acid.—*Biochem. j.* 39. 91-95.
- Of 33 substances tested, three (3-hydroxy-4-aminobenzoic acid, 3-chloro-4-aminobenzoic acid and 3:4-diaminobenzoic acid) had slight inhibitory action *in vitro* on the growth of *Streptococcus pyogenes*. Slight therapeutic effect against streptococcal and pneumococcal infections in mice was shown by 3-hydroxy-4-aminobenzoic acid. Some of the compounds neutralized the inhibitory action of sulphanilamide.—E. BOYLAND.
- GOETCHIUS, G. R., & LAWRENCE, C. A. (1944.) The *in vitro* effects of *n*-substituted *p*-aminobenzoic acid derivatives upon sulfonamides.—*J. Bact.* 48. 683-687.
- Alkylaminobenzoates such as *p*-butylaminobenzoate are much less effective than *p*-aminobenzoate in neutralizing the antibacterial action of sulphathiazole. The methyl esters of alkylaminobenzoic acid and alkylaminobenzoamides have no antisulphanilamide action.—E. BOYLAND.
- MATTI, J., NITTI, F., MOREL, M., & LWOFF, A. (1941.) L'action de la pyridine  $\beta$ -sulfamide considérée en raison de son analogie de constitution avec la nicotinamide. [The action of pyridine  $\beta$ -sulphonamide and its analogy with nicotinamide].—*Ann. Inst. Pasteur.* 67. 240-243.
- Pyridine  $\beta$ -sulphonamide bears the same chemical relation to nicotinamide as sulphanilamide does to *p*-aminobenzoic acid. Nicotinamide, a constituent of coenzymes I and II, is an essential metabolite for some bacteria. Pyridine  $\beta$ -sulphonamide was tested on *Bacterium coli*, *Proteus vulgaris* and the flagellate *Polytomella caeca* in a synthetic medium, but had no inhibitory action on their growth.—J. M. ROBSON.
- SEVAG, M. G., & GREEN, M. N. (1944.) The mechanism of resistance to sulfonamides. I. Factors controlling the formation of arylamine from tryptophan by *Staphylococcus aureus*. II. Absence of correlation between resistance and the formation of arylamine by *Staphylococcus aureus*. Noninterference with the utilization of glucose as a critical factor in the development of resistance to sulfonamides. III. Pantothenic acid and tryptophan metabolism: the role of pantothenic acid in the synthesis of tryptophan by *Staphylococcus aureus* and the effect of vitamins on tryptophan in exercising antagonism to sulfonamides.—*J. Bact.* 48. 615-622, 623-630 & 631-638.
- I. Normal cultures of *Staphylococcus aureus* produce arylamine which is derived from tryptophan. Strains of staphylococci which are resistant to sulphonamides grow without producing the arylamine. It is possible that sulphonamides act by inhibiting the oxidation of tryptophan.
- II. Strains of staphylococci resistant to sulphonamide have developed a sulphonamide-resistant type of glucose metabolism. It is probable that the effects of tryptophane, riboflavin and pantothenic acid are important in counteracting the inhibitory action of sulphonamides.
- III. Pantothenic acid is involved in the synthesis of tryptophan from glucose and nitrogen compounds, in the oxidation of tryptophan in the presence of glucose to an arylamine, and in counteracting the inhibitory action which sulphonamides have on the utilization of tryptophan.—E. BOYLAND.
- BLISS, E. A., & DEITZ, H. C. (1944.) A comparison of the bacteriostatic activities of some of the newer sulfonamide compounds.—*Johns Hopk. Hosp. Bull.* 75. 1-13.
- In vitro* comparison of the bacteriostatic properties of sulphadiazine, sulphapyrazine, sulphamerazine, sulphamethazine, irgamid (dimethylacroyl sulphanilamide), irgafen (dimethylbenzoyl sulphanilamide) and marfanil (homosulphanilamide) revealed that sulphapyrazine was the most active of the diazine derivatives. Its activity was equalled, however, by irgafen (except against *Bacterium coli*). The test organisms employed

were group A and group D  $\beta$ -haemolytic streptococci, Type I pneumococci, *Bact. coli* and five strains of staphylococci; marfanil showed higher activity than any of the other compounds against the streptococci and staphylococci but was least active against *Bact. coli*. Tests of marfanil in two human patients showed that the drug is very rapidly excreted in the urine. It is concluded from these tests that the blood concentration must be low and therapeutically inadequate and that the clinical value of the drug will probably be limited to the treatment of local infections.—D. D. OGILVIE.

SIEBENMANN, C. O., & PLUMMER, H. (1945.) On the action of marfanil and other antioctridial agents on anaerobic blood agar plates.—*J. Pharmacol.* 84. 291-300. 697

A biological test for marfanil, using its antioctridial action against *Clostridium histolyticum*, is described. Filter papers soaked in liquid, the marfanil content of which is sought, are placed on blood agar containing a total of approximately 40,000 organisms, and the whole is incubated. The zone of inhibition of haemolysis round the paper gives a rough indication of the concentration of marfanil in the fluid.

Absorption experiments on mice, using this test, show that after intramuscular injection, the maximum blood-level is reached in under an hour, the drug disappearing from the blood after six hours, and from the urine after 16 hours. Oral administration gives lower, but more sustained blood-levels. Less than one-third of the drug was excreted in the urine unchanged. Acetylation is not the cause of the breakdown of the drug in the body.

Using this test, the antioctridial activity on *Cl. welchii* of marfanil, penicillin, sulphathiazole, sulphadiazine and *Cl. welchii* antitoxic horse serum was estimated. Weight for weight, penicillin is 800 times more effective than marfanil; *in vitro* it is only 60 times. Sulphathiazole and sulphadiazine show no inhibition *in vitro*, because of the presence of sulphonamide inhibitors in the medium. *In vivo* they show slight activity. The action of the serum is antihæmolytic, not antibacterial. Liver extract contains marfanil-inhibiting factors.—R. M. LOOSMORE.

ALBERT, A., RUBBO, S. D., GOLDCRE, R. J., DAVEY, M. E., & STONE, J. D. (1945.) The influence of chemical constitution on antibacterial activity. Part II: a general survey of the acridine series.—*Brit. J. exp. Path.* 26. 160-192. [For part I, see *V. B.* 12. 615.] 698

The antibacterial activity of 107 acridine compounds was traced back to certain underlying physical and chemical properties. A basicity sufficient to induce at least 75% ionization at pH 7.3 and 20°C. is essential for effective bacteriostasis. The activity resides mainly in the cations. There is evidence that they injure the bacteria by competing with hydrogen ions for a vital enzyme position. Substituents in the acridine nucleus exert their effect principally through controlling ionization. From the oil/water partition coefficient of a number of active compounds it is deduced that their action takes place in the aqueous phase. Three new drugs are recommended for clinical trial, *viz.* 1:9-dimethyl-proflavine, 1-methyl-5-aminoacridine, and 2-nitro-5-aminoacridine.—J. M. ROBSON.

STEVENSON, E. C., & MITCHELL, J. W. (1945.) Bacteriostatic and bactericidal properties of 2,4-dichlorophenoxyacetic acid.—*Science.* 101. 642-644. 699

The specific weed killer, 2,4 dichlorophenoxyacetic acid inhibits the growth of *Bacillus subtilis*, *Aerobacter cloacae*, *Staphylococcus aureus* and *Phytomonas tum-*

*faciens* when present to the extent of 0.02% in a potato-glucose agar medium. Even four times as high a concentration had no apparent effect upon the growth of moulds of *Fusarium* sp. and *Penicillium* sp.—E. B.

SLANETZ, L. W., & ALLEN, F. E. (1945.) Treatment of bovine mastitis with penicillin.—*J. Amer. vet. med. Ass.* 107. 18-21. 700

The udders of 12 cows infected with *Streptococcus agalactiae* in 19 quarters were infused one, two or four times with 100 ml. of solution containing 200,000 units of penicillin and all quarters were cured. One cow with staphylococcal mastitis was cured after four injections of this solution.

Twenty-one cows infected with *Str. agalactiae* in 40 quarters were treated one, two or four times with 100 ml. of solution containing 100,000 units of penicillin. Nine out of 10 cows with 15 out of 18 quarters infused once were cured; three out of four cows with 11 out of 12 quarters infused twice were cured. All of seven cows with 10 quarters infused four times were cured. The cow which was not cured after two infusions yielded to further treatment. The other refractory animal did not yield to further treatment. She had a history of four years' mastitis.

Four cows with staphylococcal mastitis yielded to four infusions containing 100,000 units. Only one out of three cows and five out of eight quarters yielded to one infusion. All cows which were said to be cured were free of mastitis streptococci and staphylococci five weeks after treatment.—R. M. LOOSMORE.

BARKER, C. A. V. (1945.) Observations on the use of penicillin in the treatment of bovine mastitis.—*Canad. J. comp. Med.* 9. 235-243. 701

Infected quarters were determined by means of Foley's modified Hotis test. Approximately 24 hours later and as soon after milking as possible, 25,000 Oxford units of penicillin dissolved in 100 ml. of sterile distilled water were injected into each infected quarter. Subsequent examinations to check the efficiency of treatment were made at the first and second milkings, and at intervals of two days, a week and a month. Basing non-infection on negative findings at the test after one month, 16 of 32 quarters of 16 lactating cows responded favourably. In some instances, infusion of the penicillin solution gave rise to swelling and hardness in the udder, thick clots of milk for a short time following treatment and a slight rise in temperature. These reactions were transitory and were not followed by any serious changes in the secretory capacity of the udder. B. feels these reactions may have been due to pyrogens in the infused solution. Optimum dosage and number of treatments have not yet been established.—J. L. BYRNE.

KLEIN, L. A., CRISMAN, D. W., & MOOR, J. W. (1945.) Effect of local injections of penicillin on staphylococci in the cow's udder.—*Amer. J. vet. Res.* 6. 3-8. 702

Seven udder quarters infected with mastitis staphylococci were treated with 4-8 injections each of 22,800 Oxford units of penicillin in 500 ml. sterile saline. The injections, made at six-hour intervals, caused temporary sterility of the milk but in only two cases, both of which had eight treatments, was the infection permanently destroyed.—E. BOYLAND.

KAKAVAS, J. C. (1945.) *In vitro* studies on the basis for sulphanilamide therapy in bovine mastitis.—*Amer. J. vet. Res.* 6. 9-16. 703

Tests *in vitro* show that sulphanilamide (20 mg. per 100 ml.) will not destroy Lancefield group B streptococci at 37°C. but will do so at 40-5°C. Higher concentrations of sulphanilamide (100 mg. per 100 ml.) will destroy the organisms at 37°C. The antibacterial



action of 25 parts of sulphanilamide is neutralized by the presence of one part of *p*-aminobenzoic acid. Sulphonamide action in the udder is therefore dependent on the temperature of the organ, the concentration of sulphonamide and the concentration of sulphonamide antagonists.—E. BOYLAND.

SMITH, M. I., & McCLOSKEY, W. T. (1945.) The chemotherapeutic action of streptomycin and promin in experimental tuberculosis.—*Publ. Hlth Rep., Wash.* 60. 1129-1138. 704

G. pigs infected with human tubercle bacilli were given daily intramuscular injections of 5,000 units streptomycin. Other groups were left untreated, dosed with promin daily (500 mg. per kg. orally) and treated with both streptomycin and promin. The streptomycin treatment was more effective than promin in reducing mortality, in reducing the TB. index and in increasing the growth of the animals. Promin and streptomycin used together appeared to have a synergistic action and gave better therapeutic results than have been obtained previously.—E. BOYLAND.

SMITH, M. I., & McCLOSKEY, W. T. (1945.) Chemotherapy of sulfones and sulfonamides in experimental tuberculosis.—*Amer. Rev. Tuberc.* 52. 304-311. [Spanish summary.] [Authors' English summary copied verbatim.] 705

The chemotherapeutic effectiveness of two sulfones and three sulfonamides was examined in experimental tuberculosis in guinea pigs in comparison with 4-4'-diaminodiphenylsulfone. The two sulfones, the triamido phosphoric acid derivative and promizole, showed a degree of retardation of the tuberculous process comparable with diaminodiphenylsulfone. Promizole, however, was the more toxic of the two. Of the three sulfonamides, sulfabamide was too toxic, ergamide gave little protection and irgafen showed a slightly favorable effect.

KONST, H. (1945.) Chemotherapy of swine erysipelas. Trials using sulfanilamide, sulfapyridine and sulphathiazole in experimental infection of mice.—*Canad. J. comp. Med.* 9. 135-139. 706

The sulphonamides were administered in the feed or an average of 10 days before challenging with *Erysipelothrix rhusiopathiae*. The dose was usually 1-3 but never more than 10 M.L.D. Sulphapyridine was more toxic than sulphanilamide. Sulphathiazole produced no marked toxic symptoms even when the daily intake was considerably higher than that of the other two drugs. Under the conditions of the experiment, the drugs failed to control *E. rhusiopathiae* infection of mice and it is therefore considered unlikely that they would prove of value in the treatment of swine erysipelas.

—R. GWATKIN.

GORDON, M., & ZINNEMANN, K. (1945.) The in-vitro sensitivity of *H. influenzae* to penicillin with special reference to meningeal strains of Pittman's type B.—*Brit. med. J.* Dec. 8th. 795-796. 707

The growth of 47 out of 61 different strains of *Haemophilus influenzae* isolated from the nasopharynx, bronchial secretions and cerebrospinal fluid was completely inhibited by concentrations of 2-5 units of penicillin per ml. in blood-agar medium. The remaining resistant strains were all inhibited by 5 units of penicillin per ml.—E. BOYLAND.

STEWART, G. T. (1945.) Effect of penicillin on *Bacillus proteus*.—*Lancet.* 249. 705-707. 708

Although *Proteus vulgaris* is relatively resistant to penicillin it is destroyed by concentrations attainable in local or regional dosage. Six clinical cases of infection were treated by local application of penicillin and five of them showed improvement.—E. BOYLAND.

SHERSTOBOEV, K. N. (1944.) O bakteriofagoterapii i profilaktike kolibatsill'ëza i paratifat telyat i dizenterii porosyat. [Bacteriophage therapy and prophylaxis of calf colibacillosis and paratyphoid and of piglet dysentery.]—*Veterinariya, Moscow.* No. 1. pp. 14-16. 709

S. describes his work since 1939 on the preparation of bacteriophage. Polyvalent *Salmonella dublin* bacteriophage should find wide application in the therapy of coli-paratyphoid illnesses of young animals. Preparations keep well and retain their effectiveness over one and a half years, are cheap and possess many advantages over other bio-preparations, especially in war-time. In piglet dysentery 50-100% cures were effected in the first 48 hours; in calf colibacillosis up to 87% and in calf paratyphoid up to 49% cures were effected. The remainder of the animals required longer treatment.—A. CARTER.

REED, G. B., & ORR, J. H. (1945.) N-benzoyl-sulphanilamide in experimental gas gangrene.—*Canad. J. Res. Sect. E.* 23. 85-88. 710

It is shown that in regard to gas gangrene clostridia the *in vitro* bacteriostatic action of N<sup>1</sup>-benzoyl-sulphanilamide is similar to that of sulphathiazole and sulphadiazine. In local treatment of experimental gas gangrene in g. pigs, N<sup>1</sup>-benzoyl-sulphanilamide is equal to sulphathiazole in retarding infection with *Cl. welchii*, *Cl. novyi*, or *Cl. septicum*. It is slightly superior to sulphathiazole in retarding *Cl. sordellii* infections.

—J. A. NELSON.

EVANS, D. G., FULLER, A. T., & WALKER, J. (1945.) Chemotherapy in experimental tetanus.—*Lancet.* 249. 336-338. 711

*In vitro* tests showed that *p*-methylsulphonylbenzamide hydrochloride (V.187), *p*-methylsulphonylbenzylamine hydrochloride (V.335) and marfanil, in that order of effectiveness, are 250-700 times as active against *Clostridium welchii* as is sulphathiazole. All the drugs were three times as active against *Cl. tetani* as against *Cl. welchii*.

Mice were given a calcium chloride injection followed by an inoculation with varying dilutions of a washed saline suspension of *Cl. tetani*, a dose of 50 organisms of which regularly produced fatal tetanus in mice. Two hours after infection four groups were injected once intramuscularly with 10 mg. of each of the four drugs in 5% aqueous solution. A further group was left untreated as controls. At this level, V.187, V.335 and marfanil gave 100% protection in the preliminary experiment and there was evidence of marked chemotherapeutic activity even when a higher infecting dose was given. A second experiment using more mice confirmed the effectiveness of the first three drugs, although the results were not quite 100% with an infecting dose of 50 organisms. The animals were observed for ten days after treatment.

A further test using small numbers of g. pigs confirmed these results.

Mice tolerate V.187 better *per os* than by intramuscular or intraperitoneal routes, while the reverse obtains in g. pigs, where oral toxicity is marked.

—R. M. LOOSMORE.

CHURCHILL, H. M., & COBURN, D. R. (1945.) Sulfonamide drugs in the treatment of ulcerative enteritis of quail.—*Vet. Med.* 40. 309-311. 712

Bobwhite quail receiving a single feed of intestinal material from birds which had died of ulcerative enteritis succumbed to this disease. Three medicated rations containing 2% sulphaguanidine, sulphathiazole and sulphasuxidine respectively failed to protect against quail disease. Segregation of sick birds and good

sanitation are the only methods known for controlling outbreaks.—C. HORTON SMITH.

HAMILTON, A. J. C., & KIRKPATRICK, H. J. R. (1945.) Actinomycosis successfully treated with penicillin. Report of two cases.—*Brit. med. J.* Nov. 24th. 728. 713

Two human cases of actinomycosis were successfully treated by injections of 33,000 reduced to 25,000 units of penicillin at three-hourly intervals until 5,800,000 units had been given. No inflammatory reaction was present in either patient one month after treatment had ceased.—E. BOYLAND.

GOODWIN, L. G. (1944.) The toxicity and trypanocidal activity of some organic antimonials.—*J. Pharmacol.* 81. 224-234. 714

Tests for toxicity, irritant action and trypanocidal activity of various organic antimonials were carried out in mice, *T. equiperdum* being used as the test trypanosome. The trypanocidal activity was determined by two criteria, one being the dose required to clear the circulation of parasites and the other the survival time of infected mice after treatment. The two methods gave almost identical readings with trivalent antimony compounds, whilst differences occurred in the case of phenyl stibonic acid derivatives, and quinquivalent compounds were inactive in a single dose. It is concluded that the properties investigated are independent of the antimony content, but have some correlation with one another and with the initial rate of excretion of the antimony. Tartar emetic, sodium antimony tartrate (tri- and pentavalent), anthiomaline, stibophen [= foudadin], quinquivalent stibophen, stibisol, solustibosan, sodium antimony gluconate (trivalent), sodium mannitol antimoniate, neostam, neostibosan, ureastibamine, and stibacetin were under experiment.—U. F. RICHARDSON.

BRAUSS, F. W. (1944.) Untersuchungen über die Wirksamkeit neuerer Chemotherapeutika gegenüber Nagana-Trypanosomen. [New chemotherapeutic agents for nagana.]—*Z. Immunforsch.* 105. 104-110. 715

B. describes a series of experiments to test the prophylactic and therapeutic value in trypanosomiasis of a number of compounds. A strain of *Trypanosoma brucei* was used and white mice were the experimental animals. In the sulphonamide group prontosil, eupatin, amonal, disseptal, clinfortan, and eubasin [sulphapyridine] were tested, none of these having any prophylactic or curative value.

Anticomman, a guanidine derivative used in the treatment of mild cases of diabetes, given either orally or by subcutaneous injections, caused disappearance of trypanosomes from the blood stream in 24 hours from the time of treatment; within a short interval, however, they reappeared and the final outcome of the infection was not altered. B. considers that the action of anticomman is due to a lowering of the blood glycogen to such a level that the trypanosomes retire from the blood to the liver where the glycogen level is high. There they remain until such time as the blood glycogen returns to normal.

The acridine preparation "surfen" showed activity against the trypanosomes in *in vitro* experiments. Slowing of movement and marked enlargement of the vacuole could be observed. In tests on mice, a dose of 0.05-0.5 mg. given at the time of infection prolonged life, while doses of 1-10 mg. were curative. When treatment was delayed to 24 hours or more after infection, the mice died a few days later, although a sterilization of the blood stream occurred. The deaths were considered to result from the release of toxins from the

destroyed trypanosomes. A dose of 1 mg. given 48 hours before infection enabled the mice to survive. Evidence of drug-fastness was obtained when small doses were employed. The toxicity of "surfen" in healthy mice was low and the therapeutic index is stated to be 1:50. Tested against *T. equiperdum* it proved effective, but it had no effect on *T. congolense*.

B. concludes that "surfen" has possibilities in treatment, but further work is required.—H. KLOPPER

BELL, F. R. (1945.) Further notes on the use of the phenanthridinium compound 1553 in the treatment of *Trypanosoma congolense* infection of cattle.—*Vet. Rec.* 57. 449-450. 716

The drug was tested for curative action in *T. congolense* infection of zebu cattle by subcutaneous administration, and the minimum curative dose was established at 0.8 mg. per kg. body weight. Subcutaneous inoculation produced a small slough in three out of 27 cattle and in some animals there was local shedding of hair.

In testing for the minimum toxic dose the drug was given intravenously. A dose of 3 mg. per kg. body weight produced no toxic effect in a single experiment; 4 mg. per kg. produced mild toxic effects and 6 mg. per kg. killed one out of four animals. The drug appeared either to inhibit expiration or to stimulate inhalation. Later, however, the entire group of animals developed photosensitization and 10 out of 13 animals died, the survivors being the one animal given 3 mg. per kg. body weight, and two of the four given 4 mg. per kg. The 27 animals given doses under 1 mg. per kg. body weight did not develop evidence of photosensitization.—U. F. RICHARDSON.

MCNEIL, E., & HINSHAW, W. R. (1945.) Effect of mercuric chloride on turkeys and on *Hexamita meleagridis*.—*Poult. Sci.* 24. 516-521. 717

Trials were made to determine the toxicity of mercuric chloride for turkey poults and its therapeutic value when used in the drinking water of poults infected with *Hexamita*. The drug was found to have no prophylactic or therapeutic action against hexamitiasis and proved to be toxic in dosages often used by rearers, i.e., concentrations greater than 1:8,000 may be toxic when used as the only source of drinking water for normal poults 2-8 weeks of age. The relatively non-toxic 1:8,000 dilution has no therapeutic value in the prevention or control of hexamitiasis.—C. H. S.

ANON. (1945.) Triumph against malaria.—*Brit. med. J.* Nov. 10th. 653-654. 718

Intensive research on the control and prevention of malaria was undertaken in the U.S.A. and in Great Britain on Japan's entry into the war, the loss of Java and consequent loss of supplies of quinine. This work has culminated in the announcement by Imperial Chemical Industries Ltd. of the discovery in their laboratories of an extremely active anti-malarial compound, "paludrine". In 1944 the new substance was synthesized and tested upon experimental infections of *Plasmodium gallinaceum* in chicks and other forms of avian malaria and was shown to be exceptionally active in destroying malaria parasites; its toxicity for mice was relatively low. Its therapeutic activity was shown to be equally great in naturally occurring human malaria. The compound is a white powder which, unlike mepacrine, does not stain the skin. The chemical formula, although not disclosed, is relatively simple and the manufacture should be easy. The drug is rapidly absorbed when given orally. A third of the dose is excreted in the urine. Up to 0.5 g. can be given twice daily; larger doses produce evidence of gastro-



intestinal irritation. On repeated twice daily doses the plateau of concentration in the plasma is not reached for several days. The present course of treatment consists of twice daily doses for 14 days. The smallest dose on this regime which will terminate a clinical attack of benign tertian malaria appears to be 10-50 mg. or one-fiftieth of the maximum tolerated dose. Relapses of benign tertian malaria often occur. The response of malignant tertian malaria resembles that of benign tertian but relapses are less frequent. The effect of the drug on quartan malaria has not yet been studied. It has been found that 0.1 g. daily prevented all clinical signs of malaria in volunteers exposed to mosquitoes carrying *P. vivax*. The anti-malarial action is a suppressive one exerted upon the trophozoites as they appear in the erythrocytes. The action upon *P. falciparum* is more complete. It seems that the new drug acts upon the same stage of the parasite as does quinine or mepacrine, but there is a wider range between the minimum effective dose and the maximum tolerated one. The name chosen for the new drug is unfortunate, as the same name had already been applied to an earlier, less successful product and confusion may ensue as a result of the duplication.—C. HORTON SMITH.

BRACKETT, S., WALETZKY, E., & BAKER, M. (1945.) The rate of action of sulfadiazine and quinoline on the malarial parasite, *Plasmodium Gallinaceum*.—*J. Pharmacol.* 84. 254-261. 719

It is possible that the length of time for effective inhibition by sulphonamides varies inversely with the growth and multiplication rate of bacteria, and, if this is so, it has important implications for the length of treatment necessary in chemotherapeutic trials with complex, slowly multiplying organisms like the protozoa. Erythrocytic stages of *P. gallinaceum* were treated continuously with large amounts of sulphadiazine or quinine; these stages were observed at frequent intervals to determine the rate of action of these drugs. Quinine completely inhibited their growth and development in four of five birds and stopped development at the 4-nucleate stage in the fifth bird. The first noticeable retardation of growth occurred within 24 but not within 12 hours. The first treated generation developed no segmentation but the average number of merozoites produced by each segmenter was reduced. The parasites never increased in number with quinine treatment and by the second day had dropped below the initial count. With sulphadiazine there was an increase in parasitaemia in the first two days, but it declined to below the initial level by the fifth day. Sulphonamides may act slowly in sporozoite-induced infections as two days of treatment were necessary for the maximum effects. The time required for effective inhibition by sulphonamides increases as the growth rate of the organism decreases.—C. HORTON SMITH.

ONES, D., BEAUDETTE, F. R., GEIGER, W. B., & WAKSMAN, S. A. (1945.) A search for virus-inactivating substances among microorganisms.—*Science*. 101. 665-668. 720

Cultures of numerous bacteria, actinomycetes and other fungi were tested for virus inactivation, using fowl pox, avian laryngo-tracheitis and chick bronchitis viruses for the tests.

The strains for the inactivating substances were isolated from compost, manure, soil, etc., by plating on glycerol-phosphate medium to which was added fowl pox virus purified by differential centrifugation. Evidence of suppression of growth was detected by exposing egg-propagated virus to filtrates from the organisms under test for five hours at room temperatures and then transferring to the chorio-allantoic membrane.

Reduction of the "pock" counts, when compared with control membranes inoculated with untreated virus, indicated inactivation of the virus.

Of 150 organisms tested, only three showed any effect. *Actinomyces antibioticus* S-4 (straw compost) was active against fowl pox and avian laryngo-tracheitis but ineffective against chick bronchitis. *Trichoderma* sp. 117-15 (straw compost) and *Actinomyces* sp. P-12 were moderately effective against fowl pox alone. These substances have not yet been tested *in vivo*.

—R. E. GLOVER.

BEDSON, S. P., & MAY, H. B. (1945.) Penicillin in experimental psittacosis of mice.—*Lancet*. 249. 394-396. 721

Although the psittacosis virus in mice is susceptible to penicillin, the doses required are high, so that treatment of human cases is expected to require enormous doses.—E. BOYLAND.

WOOD, H. G., & RUSOFF, I. I. (1945.) The protective action of trypan red against infection by a neurotropic virus.—*J. exp. Med.* 82. 297-309. 722

Mice injected intraperitoneally with trypanred on three successive days were rendered resistant to a small intraperitoneal dose of mouse poliomyelitis virus (M.M. strain) which killed from 60-100% of untreated controls (47 out of 49 treated survived; 35 out of 50 controls became infected). No effect was observed when the drug was incubated with virus before injection, or when the dye and inoculum were injected simultaneously.

The protective effect lasted for at least 29 days, although these experiments were complicated by the age increase in the resistance of mice to the virus. No immunity was observed when mice were tested with the M.M. virus by the intracerebral route; in contrast, a slightly lower incidence was found in treated mice inoculated with the Lansing strain. Some evidence of protection in cotton rats is reported, but in monkeys the dye was apparently without effect. Of nine drugs tested only congo red and brilliant vital red were effective, although to a less extent than trypanred.

—R. E. GLOVER.

JACK, J. A. (1945.) Treatment for internal and external parasites in foxes.—*Amer. Fur Breed.* 17. No. 11. 26-28. 723

This is a popular article on control measures suitable for use on fox farms against internal and external parasites.—J. B. CRAGG.

SCHÖNBERG, F. (1944.) Neue erfolgreiche Bekämpfung der Fliegenplage in Schlächtereien-Kompanien, Fleischereien, Fleischwarenfabriken, Lebensmittellagern und Ställen. [Control of the fly pest in food establishments.]—*Z. Fleisch- u. Milchhyg.* 54. 115-119 & 127-128. 724

S. describes experiments using a material "gix" (prepared by I. G. Farbenindustrie), the action of which is very similar to that of gesarol (D.D.T.). A 0.1% solution sprayed on walls, etc., should remain toxic to flies for 4-5 weeks.—J. B. CRAGG.

FILATOV. (1943.) Solyarovoe maslo pri vshivosti u loshadei. ["Solyar oil" in the treatment of lice-infested horses.]—*Veterinariya, Moscow*. No. 1. p. 43. 725

Solyar oil, an oily liquid consisting of "avtol", heavy fractions of benzene and some creolin, is commonly used for lubricating tractors and Diesel engines. Applied with a brush against the lie of the hair it renders the lice inert in 5-10 min.; in 20-30 min. the lice lie loosely on the surface and can easily be brushed off.

500-700 [? ml.] is sufficient for the treatment of one horse and as the nits, too, are destroyed after a few days, no repeated treatments are required. No injurious effects of any kind have been observed and the treatment can be carried out at any time of the year.

—E. CHERKESI.

THOMPSON, J. N., & DELAPLANE, J. P. (1944.) A quick economical and effective method for delousing turkeys.—*Progr. Rep. Tex. agric. Exp. Sta.* No. 879. pp. 2. 726

The method described in this leaflet is the application of 40% nicotine sulphate solution to the skin of the abdomen, about one inch posterior to the rear end of the sternum. 1-2 drops applied in this position from a thin wooden stick are said to kill all body and feather lice on mature breeding turkeys in 20-30 min. and the treated birds remain free of lice for six weeks after treatment. No harmful effects were observed as a result of the application.—J. D. BLAXLAND.

BRUFORD, J. W., & FINCHAM, I. H. (1945.) A phenothiazine trial in calves. An investigation into the possible toxicity of phenothiazine for calves, with observations on an unexpected outbreak of acute parasite gastro-enteritis.—*Vet. Rec.* 57. 421-424. 727

A trial involving 40 yearling calves was organized to test the anthelmintic efficiency of phenothiazine against gastro-intestinal parasites and to investigate the toxicity of phenothiazine for calves. After an initial treatment of half the calves with phenothiazine, the whole group was confined to a 16-acre rough, permanent pasture when as a result of overcrowding and malnutrition an acute outbreak of parasitic gastritis occurred. This outbreak was controlled by three further treatments with phenothiazine at fortnightly intervals. A complete history of the outbreak is given, including faecal egg counts, weights and worm counts of calves dying during the trial. The chief conclusions may be stated as follows. In spite of treatment with phenothiazine, heavy larval intake combined with adverse conditions may result in acute nematode infestation. Repeated treatment with phenothiazine, four times at fortnightly intervals, is required to overcome massive infestation. Doses of 40-100 g. phenothiazine may be given without ill-effect even to weak, heavily parasitized calves. Phenothiazine is inactive against immature nematodes. In spite of the unexpected outbreak of parasitic gastritis which occurred in this trial the calves treated at the beginning eventually progressed better as judged by appearance and weight gains.—T. E. GIBSON.

THORP, W. T. S., HENNING, W. L., & SHIGLEY, J. F. (1945.) Phenothiazine as an anthelmintic for breeding ewes.—*J. Anim. Sci.* 4. 133-140. 728

A 1:9 phenothiazine-salt mixture was fed to 20 ewes for three years, during which time the average egg count remained low and showed little variation. Blood studies, and P.M. studies on three ewes which died, showed no ill-effect which could be attributed to the phenothiazine administration. The lambs produced by these ewes in two consecutive seasons and whilst receiving 1:9 phenothiazine-salt mixture were healthy and their number was normal for the district, but they had a relatively high parasite infestation as measured by egg counts. There was thus sufficient residual infestation in the ewes to cause infestation in the lambs, which themselves consume only small quantities of the phenothiazine-salt mixture.

Two groups of ten lambs each were allowed to run with ewes that were treated in spring and autumn but received no other treatment and in these lambs also a relatively high parasite infestation developed. Ten

lambs were also kept with their dams on a 1:9 phenothiazine-salt mixture and developed a heavy parasitic infestation. The following season these lambs were maintained on a 1:9 phenothiazine-salt mixture and there was a decided drop in egg count, but a small residual infestation remained.

Four ewe flocks on farms gave similar results to those for experimental sheep described above. The authors conclude that the administration of a 1:9 phenothiazine-salt mixture to ewes leaves enough residual infestation to produce mild parasitism in the lambs and it is, therefore, important to drench in the spring and autumn in addition. The toxicity of phenothiazine administered as a salt mixture has not been definitely ascertained but it appears to be relatively non-toxic.—T. E. GIBSON.

SEGHEITI, L., & MARSH, H. (1945.) Control of intestinal parasitism in lambs by winter treatment of ewes, as compared with the use of phenothiazine in salt in summer.—*Amer. J. vet. Res.* 6. 159-164. 729

An experiment was carried out to assess the value of winter treatment with phenothiazine combined with the feeding of a 1:9 phenothiazine-salt mixture for the control of subclinical parasitism in ewes and their lambs. 110 ewes were used in the experiment. Fifty-five were treated with 25 g. of phenothiazine on January 22nd and March 31st, but in May their parasite burden as estimated by faecal egg count was as high as that of the 55 untreated controls; they were given a further treatment on May 20th. Both groups were placed with their lambs on similar pastures during May and the first half of June. A 1:9 phenothiazine-salt mixture had been available to both groups from April 6th onward.

It was found that although five days after the final treatment in May the phenothiazine-treated group had a count of only 10 eggs per gramme of faeces and the controls one of 590 e.p.g., by August 7th with the feeding of 1:9 phenothiazine-salt mixture, the average count for the two groups was 47 and 55 respectively. The egg counts of the two groups of lambs remained equal and never exceeded 125 e.p.g. The average count of lambs from the same ewes in the previous year had been 1,300 e.p.g. When the animals were weighed in October, there was no significant difference between the two groups, the average weight of the 78 lambs in the two groups being 72.6 lb. The average weight of 39 lambs from the same ewes in the previous year, on the same pastures but without phenothiazine-salt mixture, was 63 lb.

The authors concluded that when sheep will take phenothiazine-salt mixture freely during spring and summer there is no advantage to be gained by dosing ewes in the winter. A 1:9 phenothiazine-salt mixture, when given at the rate of 0.8 g. per head (1.5 g. for each ewe and lamb), is effective in preventing clinical parasitism in lambs and also in reducing the worm burden in the ewes.—T. E. GIBSON.

ENZIE, F. D., HABERMANN, R. T., & FOSTER, A. O. (1945.) A comparison of oil of chenopodium, phenothiazine, and sodium fluoride as anthelmintics for swine.—*J. Amer. vet. med. Ass.* 107. 57-66. 730

Critical tests were performed on 66 pigs. 20 pigs were given 0.05 ml. oil of chenopodium per lb. body weight by stomach tube, followed immediately by a purgative dose of castor oil. 86 out of 100 ascarids were eliminated from these pigs but the drug was comparatively ineffective against stomach worms [*Hyostromylus rubidus*], nodular worms [*Oesophagostomum* sp.] and whipworms [*Trichuris suis*]. Several pigs vomited after treatment and one died. A second group of 20 pigs



was given phenothiazine at the rate of 0.2 g. per lb. body weight, the drug being mixed with the food. Less than 1% of 390 ascarids was removed, but the drug was quite effective against nodular worms and was well tolerated by the pigs. Sodium fluoride was given to 26 pigs in 150 g. doses as a 1% mixture in the feed. All of 23 ascarids were eliminated but its action against other intestinal helminths was not determined. Several pigs vomited after treatment and one died.

A consideration of these results together with those of other workers leads the authors to conclude that oil of chenopodium is more effective than phenothiazine against ascarids, but that phenothiazine is more effective against nodular worms and is more easily administered. Toxic effects have been reported following the use of both drugs, young pigs appearing to be more susceptible than older ones to intoxication with phenothiazine. Fewer trials have been performed with sodium fluoride but the limited tests which have been carried out show it to be superior as an ascaricide to both oil of chenopodium and phenothiazine. It is easy to administer and is as well tolerated as either oil of chenopodium or phenothiazine. Further trials will be necessary for the proper evaluation of its efficacy as an anthelmintic for pigs.—T. E. GIBSON.

BENHAM, G. H. (1945.) The fate of phenothiazine in rabbits. I. The detection of a new conjugate in rabbits' urine after the feeding of phenothiazine.—*Canad. J. Res. Sect. E.* 23. 71-79. 731

Whereas sheep excrete potassium leuco phenothiazine sulphate after oral administration of phenothiazine, rabbits excrete a glucuronic acid conjugate of leuco phenothiazine [leuco thionol]. The increase in glucuronic acid excretion above the normal on feeding phenothiazine is in a molar ratio of 1:1 with respect to the excreted leuco phenothiazine. The conjugate was not isolated.

A method for the determination of glucuronic acid has been reported based on Mozolowski's modification of Tollin's test.—J. A. NELSON.

BURMESTER, B. R. (1945.) Sulfonamides without effect on transplantable lymphoid tumors of the fowl.—*Poult. Sci.* 24. 477-479. 732

Tests were carried out on the effect of sulphathiazole and sulphamerazine upon two strains of transplantable lymphoid tumour of the fowl. The tumour strains employed were those obtained by OLSON [see *V. B.* 14. 16] and by BURMESTER *et al.* (1945). Most chicks inoculated with viable cells of these tumour strains died within two weeks of injection. Sulphathiazole and sulphamerazine when included up to 4 g. per lb. as an ingredient of their food, had no influence upon the incidence of tumour formation, nor did it affect the average survival period.—F. D. ASPLIN.

RIBEIRO, F., & GUIMARÃES, L. M. (1942.) Nota preliminar sobre a ação local da vitamina F em lesões cutâneas. [Effect of the essential fatty acids on cutaneous lesions in dogs and horses].—*Rev. Fac. Med. vet. S. Paulo.* 2. No. 2. 41-43. 733

Cutaneous habronemiasis in horses was said to respond to the application of an ointment containing "vitamin F" (as represented by linoleic and linolenic acids), the fibrous swelling being first reduced by the application of one part  $H_2SO_4$  in four parts of alcohol. This combined treatment was stated to result in healing in about 20 days.

Canine eczema with discrete ulcer formation, and superficial injury with loss of skin in the horse, both responded favourably to this therapy.

The authors believe that this therapy is of value

in stimulating the formation of cicatricial tissue in skin lesions arising from various causes.—I. W. B.

GUNN, C. K. (1945.) Preliminary note on the treatment of anaemia in mutant fox pups.—*Amer. Fur Breed.* 18. No. 2. 30, 32 & 34. 734

An hereditary anaemic condition, 100% fatal, is described in platinum fox pups of the Quebec and Norwegian mutant strains. Pups two weeks to four months old are affected and show symptoms of loss of appetite, emaciation, sunken eyes and dry fur. They become progressively weaker as the anaemia becomes more severe and the faeces are often black. On examination P.M. the carcass is blanched, the spleen and liver are small in size, and intestinal haemorrhages are often found. Examination of the blood reveals a low erythrocyte count, achromia and slow clotting. Attempts have been made to treat the condition by dietary means and as a result G. recommends that vixens in the last month of pregnancy and pups up to 4-5 months of age should receive daily administration of a mixture containing 1 ml. of a proprietary vitamin concentrate containing vitamins A, B<sub>1</sub>, B<sub>2</sub>, C and D; 2 minims of ferric ammonium citrate and 6 mg. of a synthetic vitamin K substitute. It is recommended in addition that the diet of the pups should be 10% fresh liver, 50% horse meat, 15% tripe, 20% finely ground cereal feed, 4% finely ground green bone or 2% finely ground commercial steamed bone meal, 1% whole linseed.—T. E. G.

KRESTIN, D. (1945.) Treatment of rickets with single massive doses of vitamin D<sub>2</sub>.—*Lancet.* 248. 781-783. [See also *V. B.* 15. 235.] 735

Groups of infants showing active rickets on radiological examination of the lower ulnar epiphyses were treated orally with single massive doses of vitamin D<sub>2</sub> and the results were compared with other groups receiving daily allowances of Ministry of Food cod liver oil or other vitamin preparations.

Those groups with slight or early radiological changes were given 300,000 I.U. (7.5 mg.), but this dosage gave unsatisfactory results in children under one year, as compared with those receiving cod liver oil daily. In a further series with more severe rickets, infants given a single dose of 600,000 I.U. compared favourably enough with other groups receiving 3,250 I.U. daily to warrant a place for this method in anti-rachitic therapy. Based on the criteria of gains in body weight and height and resistance to infection, those infants receiving the massive dose of vitamin D<sub>2</sub> but no vitamin A were at little disadvantage compared with those receiving daily preparations containing both vitamins.

The indications for the method are its simplicity, safety and saving of time, trouble and material when dealing with large numbers of children, and it should prove useful when daily dosage is either impracticable, unreliable or has deleterious effects upon the patient.—A. EDEN.

CASIDA, L. E., MCSHAN, W. H., & MEYER, R. K. (1944.) Effects of an unfractionated pituitary extract upon cystic ovaries and nymphomania in cows.—*J. Anim. Sci.* 3. 273-282. 736

The effects of extracts of acetone-desiccated sheep pituitary on cows with cystic ovaries were tested. The cows, in all of which one or more cysts exceeding 2.5 cm. diameter, but no corpora lutea, could be palpated on rectal examination, were divided into three groups. Group I consisted of 71 cows all of which had shown symptoms of nymphomania for at least two months. Group II consisted of 12 cows which showed symptoms of nymphomania and in which endometritis

and salpingitis were present, in addition to the cyst in the ovary. Group III comprised 13 cows which showed only cystic ovaries without symptoms of nymphomania.

Treatment for all three groups consisted of the intravenous injection of a dose equivalent to 1 g. of sheep pituitary. The state of the genital tract was determined by rectal examination before, at the time of, and from 10-40 days after injection.

In 55 of the cows in group I, the nymphomaniac symptoms ceased within eight days and corpora lutea were formed within 31 days; most of these later came into normal oestrus. Forty-six of the cows were served and in 31 of these pregnancy occurred. Thirteen of the cows required a repetition of the injection, as nymphomania recurred; of these six became pregnant. In group II, nymphomania disappeared in a similar proportion to the first group. Six cows were served but no pregnancies resulted. In group III, corpora lutea formed in nine, seven were served and four became pregnant.

There were no controls but the results are considered to indicate that the treatment was of value in curing the condition.—F. L. M. DAWSON.

NOLTE, W. A., & JAMES, L. H. (1944.) A study of the germicidal power of sodium chlororhophenylphenate compared with calcium hypochlorite in the presence of tomato juice.—*Food Res.*, Ill. 9. No. 5. 367. [Abst. in *J. Dairy Sci.* 28. No. 6. A75, copied verbatim.] 737

One of the limitations of the commonly used chlorine compounds as disinfectants and sterilizers in dairy plants is the loss of bactericidal efficiency in the presence of small quantities of organic matter. In this study, sodium chlororhophenylphenate, one of a group of newer germicides obtainable from Dow Chemical Company, was found to have high killing power (99 per cent) even in a solution containing 2.77 per cent solids (tomato) at a concentration of 0.025 per cent. Calcium hypochlorite (a good germicide in the absence of organic matter) had no bactericidal action under like conditions at concentrations between 40 p.p.m. and 254 p.p.m. of available chlorine and between pH 4.60 and 6.07.

MARES, H. C., WYSS, O., & STRANDSKOV, F. B. (1945.) Studies on the mode of action of compounds containing available chlorine.—*J. Bact.* 49. 299-305. 738

In a study of the bactericidal properties of various forms of active chlorine, results have been obtained which concern the mechanism by which N-chloro compounds react in aqueous solution. The bactericidal effect may be due to the direct action of the molecule of the chlorine compound, or to the small concentration of hypochlorous acid which may be present under equilibrium conditions of hydrolysis and ionization in dilute aqueous solutions. The pH values of the dilute solutions which were used experimentally ranged from 4-9. It was found that the rate of sterilization decreased rapidly as the pH increased and that it was the undissociated hypochlorous acid, the concentration of which depended upon the pH of the solution, which was the active form. A factor other than hydrolysis which may influence the reactivity of N-chloro compounds is the inherent toxicity of the unhydrolysed molecule and this may vary widely in different N-chloro compounds. The rate of sterilization is also dependent upon the ratio of nitrogen to chlorine.—E. M. J.

JENNINGS, B. H., BIGG, E., & OLSON, F. C. W. (1944.) The use of glycol vapours for air sterilization and the control of air borne infection.—*Heat. Pip. Air Condit.* 16. 538-545. [Abst. in *Bull. Hyg., Lond.* 20. 98, copied verbatim. Signed: T. BEDFORD. 739

Propylene glycol and triethylene glycol vapours have been shown to be effective agents for air sterilization. Effective concentrations are 0.2 mgm. propylene glycol, or 0.005 mgm. triethylene glycol per litre of air.

These authors show that bactericidal concentrations of glycol vapours can be maintained in large occupied spaces for long periods of time, and that the vapours can be uniformly distributed in large rooms. One of the troubles in the application of bactericidal mists is that when effective concentrations are achieved there is a risk that some occupants will be exposed to irritating concentrations. Here a means of generating glycol vapours in controlled amounts is described, and it is remarked that the occupants of treated rooms experienced no discomfort.

Because of the lower concentration required, triethylene glycol was used in these tests. The glycol was vaporized from an aqueous solution. Dilute solutions vaporize at a temperature somewhat higher than the boiling point of water, whereas solutions with but small water contents vaporize at temperatures nearer to the boiling point of pure glycol, 548°F.

Both water and glycol are given off from the boiling mixture, but the proportions of the two vary with the boiling point, i.e. with the concentration of glycol in the mixture.

The control system devised for the vaporizer includes a thermostat which controls a solenoid valve in the water feed to the vaporizer, so that the temperature of the boiling point can be controlled. This governs the ratio of the quantities of glycol and water vapour given to the air. Then, by varying the rate of heat input to the vaporizer, the rate at which the liquid is vaporized is controlled.

Field tests show that this method of control is effective. The vapours were discharged into the ventilation system and distributed with the ventilating air. It was found necessary to add glycol to the vaporizers once every three or four weeks, but no other servicing was needed.

BIGG, E., JENNINGS, B. H., & OLSON, F. C. W. (1945.) Epidemiologic observations on the use of glycol vapors for air sterilization.—*Amer. J. publ. Hlth.* 35. 788-798. [Authors' summary copied verbatim.] 740

A practical installation for triethylene glycol generation and distribution was made in a military camp. Glycol concentrations of 0.0025 to 0.004 mg. per liter of air and optimum relative humidities were maintained. Studies were made on three groups of 640 men, observed for 6 week intervals and equally divided into test and controls; the former sleeping in glycol-treated quarters, the latter in untreated dormitories. An overall reduction in air-borne disease of 12 per cent was produced for the entire period, but the statistics on the final 17 days showed a reduction of 64 per cent. Explanations for this phenomenon are presented. The incidence of hemolytic streptococci recovered from throat cultures of men exposed to the effect of the glycol vapours fell dramatically in contrast to the control individuals. There was a definite prevention of spread of these organisms in the dormitories.

SOMMER, H. E., & STOKES, J., Jr. (1942.) Studies on air-borne infection in a hospital ward. I. The effect of ultraviolet light on cross-infection in an infants' ward.—*J. Pediat.* 21. 569-576. 741

HENLE, W., SOMMER, H. E., & STOKES, J., Jr. (1942.) Studies on air-borne infection in a hospital ward. II. Effects of ultraviolet irradiation and propylene glycol vaporization upon the prevention of experimental air-borne infection of mice by droplet nuclei. *Ibid.* 577-590. 742



I. Experiments in a hospital ward by the authors on the effect of ultra-violet irradiation in reducing air-borne cross-infections were less satisfactory than those of other workers. The failure is ascribed to several uncontrollable factors, such as the movement of patients to other parts of the building and the impossibility of checking the nasopharyngeal flora of the medical staff and visitors. It is considered that the effort, time and cost involved do not warrant the maintenance of the special routine which is required.

II. With the object of obtaining further information on cross-infection, mice were exposed in a ward divided into 16 separate cubicles to a highly virulent group "C" streptococcus in the form of an aerosol mist containing approximately 3,000 cocci per cu. ft. of air. Under these conditions most of the mice died of streptococcal infection. Smaller doses, e.g., 250 streptococci per cu. ft. induced a carrier state which was revealed by the subsequent intranasal installation of influenza virus.

When the room was irradiated, mice exposed to much higher concentrations of streptococci, in which the surviving organisms numbered about 1,500, usually failed to become carriers, an indication that U.V. light, even if it is non-lethal, may modify the invasive powers of the organisms. Propylene glycol vapour, on the other hand, sterilized the air completely, but a lag period occurred whilst the glycol was building up in

the air to the requisite concentration. Both U.V. light and propylene glycol were effective in preventing air-borne infection of mice with influenza "A" virus.

—R. E. GLOVER.

WHEELER, S. M., INGRAHAM, H. S., HOLLAENDER, A., LILL, N. D., GERSHON-COHEN, J., & BROWN, E. W. (1945.) Ultra-violet light control of air-borne infections in a naval training center.—*Amer. J. publ. Hlth.* 35. 457-468. 743

A study was made of the efficiency and practicability of ultraviolet irradiation as a method of reducing the spread of respiratory infection in naval barracks. The floors and upper air of the premises were irradiated from high-intensity sources providing 235 watts of U.V. energy per dormitory containing 112 men [no room measurements given]. Examination of air from irradiated barracks showed a reduction of about 50% in total saprophyte colony counts as compared with those from control barracks.  $\beta$ -haemolytic streptococci were appreciably reduced in number. Observations on naval recruits housed in the barracks, compared with the personnel of control barracks, established that high-intensity irradiation was accompanied by a 25% reduction in respiratory illness. The effect was most noticeable in the early winter months when the reduction in incidence was about 35%. Further work is necessary before a final assessment in the matter can be made.

—D. D. OGILVIE.

See also absts. 686 (sulphadiazine), 553 (antibiotic for TB.), 575 (treatment of porcine cutaneous spirochaetosis), 683-685 (D.D.T.), 610, 681, 682 (anthelmintics), 653 (virucidal action of ascorbic acid), 650 (treatment of rickets), 632 (treatment of shock), 676 (wound treatment).

## HYGIENE, PUBLIC HEALTH AND VETERINARY SERVICES

GLÄSSER, (1943.) Wandlungen in der Lehre von den bakteriellen Fleischvergiftungen in den letzten Jahren. [Changes in the teaching concerning "meat poisoning" in recent years.]—*Berl. Münch. tierärztl. Wschr.* [Wien tierärztl. Mschr. Oct. 29th. 367-372. 744

G. gives an account of changes which have taken place in meat inspection methods in recent years. The specific bacilli responsible for meat poisoning are mentioned and diagnostic methods are discussed. Recent changes in methods of dealing with carcasses infected with specific organisms are described, particularly heat treatment.—N. CORCORAN.

LEONOV, N. I. (1943.) Zadachi veterinarnoi nauki v 1943 godu. [Problems of veterinary science for 1943.]—*Veterinariya, Moscow*. No. 1. pp. 9-12. 745

L. reviews the work of the veterinary services during the first 18 months of war with Germany.

The incidence of infectious diseases continued the downward trend of pre-war years in spite of the mass

evacuation of stock and the calling-up of a large number of veterinary surgeons. Statistical data for 1941-42 show a decrease in epidemics compared with 1940; there was a further decrease in 1942. The number of deaths in 1942 was reduced to one-sixteenth of those in 1940 in the case of equine encephalomyelitis and ovine brucellosis, to one-tenth in the case of anthrax, infectious anaemia and glanders, to one-ninth in the case of piroplasmiasis and brucellosis, to between one-seventh and one-eighth in the case of rinderpest and swine erysipelas and to one-half in the case of equine piroplasmiasis.

Unsatisfactory features were the lack of specific remedies against foot and mouth disease, sheep pox, equine infectious anaemia and equine encephalomyelitis (figures for E.E. declined in 1942; nevertheless its incidence is still high in some regions of the U.S.S.R.) and an increase of mange in horses and sheep, although well tried remedies are available for its eradication.

—E. CHERKESI.

See also absts. 561, 562 (salmonellosis), 604 (condemnation of lamb's liver), 608, 609 (trichinosis), 724 (fly control in food establishments).

## TECHNIQUE AND APPARATUS

CUNNINGHAM, C. H., & STUART, H. O. (1944.) Egg-yolk medium for the cultivation of *Hemophilus gallinarum*.—*Amer. J. vet. Res.* 5. 142-146. 746

Egg-yolk is shown to be a satisfactory substitute for, if not an improvement on chicken blood in providing certain essential growth factors required by *H. gallinarum*. Agar enhances growth, while sodium chloride is essential. Of a variety of media tested, egg-yolk nutrient agar slants (one yolk per 100 ml. medium) containing 0.8% sodium chloride and with physio-

logical saline at the base of the slants, proved most satisfactory.—H. SCOTT McTAGGART.

BOND, E. W. (1945.) A convenient method for preparing graduated capillary serological pipettes for use in pullorum agglutination test.—*Canad. J. comp. Med.* 9. 166-167. 747

A capillary tube is drawn out so that 0.02 ml. will be obtained in approximately 1 in. of the tube. It is then graduated by drawing into it the desired amount of water from a graduated pipette; this is done by

means of a lubricated rubber bulb which is manipulated as if it were a micrometer screw. The graduations are marked with red waterproof ink which is rendered permanent by passing through the gas flame until the ink turns black.—J. L. BYRNE.

KNAYSI, G. (1945.) On the microscopic methods of measuring the dimensions of the bacterial cell.—*J. Bact.* 49. 375-381. 748

A comparative study of the cell widths of *Bacillus mycoides* and *B. cereus* shows that the value obtained depends on the treatment of the cells. Cell width was determined from photomicrographs with the aid of a special scale. Measurements of living cells in the medium in which they were grown showed close agreement with those of similar cells stained by a method showing the cell wall [see KNAYSI—V. B. 11. 755]. In smears stained by ordinary methods which do not show up the cell wall, the cells appear much smaller than they really are, only the shrunken cytoplasm being visible. With negative-staining methods the cells may appear larger or smaller than their real size, depending on the thickness of the dye film which surrounds them.

—H. SCOTT McTAGGART.

HAAS, V. H., FELDMAN, H. A., & EWING, F. M. (1945.) Serial passage of *Plasmodium gallinaceum* in chick embryos.—*Publ. Hlth Rep., Wash.* 60. 577-582. 749

A method is described by which *Plasmodium gallinaceum* has been established in chick embryos. The parasites used to initiate the serial passages discussed were obtained from the heart blood of a one-day-old chick which had hatched out from an embryo representing the ninth serial passage by inoculation of parasitized blood into the body of embryos 11 days old. There were advantages in using embryos 11-12 days old. Fourteen serial passages of *P. gallinaceum* have been carried through by intravenous inoculation of parasitized blood into embryos 10-13 days old. The infections thus produced are highly fatal, the majority of deaths occurring on the ninth day after inoculation. The authors found that an over-all mortality rate of 39% occurred within the first 48 hours after inoculation, which was probably due to the difficulties associated with the method. The number of embryos which survive this period is sufficient to make the method practical for carrying on the parasite. Infected embryonic membranes, fluids, livers and spleens exhibit a greenish coloration which simplifies diagnosis of the presence of malaria infections and thus eliminates the need for laborious examination of blood films.—C. H. S.

PURCHASE, H. S. (1945.) A simple and rapid method for demonstrating *Rickettsia ruminantium* (Cowdry, 1925) in heartwater brains.—*Vet. Rec.* 57. 413 & 414. 750

Squash smears from the grey matter of the cerebrum or spinal cord are recommended; in cerebellar smears search is more difficult, owing to the number of nerve cell nuclei and tendrils. A piece of material about the size of a tomato seed is placed on a clean slide, squashed with the end of a spreader slide until it spreads across the greater part of the width of the slide and then smeared by raising the upper slide at an angle of 2°-5° and drawing it along the lower one with moderate compression, so that the material covers one-third to three-quarters of the lower slide. Smears are air-dried, fixed in methyl alcohol for 2 min., and are best stained with Giemsa (1:10) for 30 min. Examination is made with the high-power objective till a collection of capillaries is located and then with the oil immersion. The rickettsia appear as dark blue bodies, whilst the cell nuclei are purplish. The haloes seen round the parasites in section preparations do not appear, which suggests they are

artefacts produced by the processing of tissue for sections.—U. F. RICHARDSON.

FLORMAN, A. L., & WEISS, A. B. (1945.) Storage of influenza virus for use in typing clinical cases.—*J. Bact.* 49. 507-509. 751

The storage of influenza viruses for the Hirst haemagglutinin test is described. Infective allantoic fluids were preserved with 0.2% formaldehyde, 0.2% sulphanilamide and 33% buffered glycerol respectively. Formaldehyde was unsatisfactory, probably because it slowly inactivated the virus; sulphanilamide- and glycerol-preserved samples, however, retained their activity unimpaired for at least 139 days at refrigerator temperature (4°C.).—R. E. GLOVER.

SUESSENGUTH, H., & KLINE, B. S. (1944.) A simple rapid flocculation slide test for trichinosis in man and in swine.—*Amer. J. clin. Path.* 14. 471-484. 752

It was found that an alkaline aqueous extract of powdered *Trichinella* larvae has the property of coating cholesterol crystals and of acting as a specific and sensitive antigen. The use of such an antigen emulsion has enabled the authors to devise a simple flocculation slide test for trichinosis in man and pigs, requiring less than 10 min. for its execution. Serum to be tested is heated at 56°C. for 30 min. or at 61°-63°C. for 4 min. 0.05 ml. of the serum is pipetted into a paraffin-ringed slide, and a small drop of antigen emulsion is allowed to fall into the serum. The slide is rotated on a flat surface for 4 min., the rotation describing a circle  $\frac{1}{4}$  in. in diameter at the rate of 150 per min. The degree of flocculation is observed at once by low-power microscopic examination. The results of trials with human cases show that the test has a high degree of specificity and sensitivity, while observations made on pigs with experimentally produced trichinosis, and on abattoir swine showed the flocculation test to be an accurate method for diagnosing infestation in the pig. In average cases the flocculation test became positive about three weeks after infestation in man and in pigs, and the reaction was still not negative in either host ten months after infestation. Because the average life of pigs fed for market is about a year, and since antibodies to the parasite are detectable by this test for as long as ten months after infestation, the authors argue that better prevention of trichinosis in man than has hitherto been possible, can be accomplished by the routine use of this simple test on pigs at the time of slaughter and by the proper disposal of animals giving a positive reaction.

—J. N. OLDHAM.

BERRY, J. C. (1945.) Reliability of averages of different numbers of lactation records for comparing dairy cows.—*J. Dairy Sci.* 28. 355-366. 753

B. presents a method, together with formulae, for comparing the productiveness of dairy cows with varying numbers of lactation records. This problem is concerned with the values of various combinations of production records, both for predicting a cow's future records and for evaluating her transmitting ability. The primary statistical ingredients used for analysis were gross and intra-herd standard deviations and correlations between different records of the same cow and between parent and offspring. Correlations between various combinations of records were calculated by formulae involving path coefficients (Sewall Wright, 1934). Analyses of a large number of actual production records show that the major increase in the reliability of prediction occurs when a second record becomes available for use along with the first; the addition of a third record adds considerably to the reliability of the estimate. Records beyond the third do not contribute enough information to be worth waiting for before



estimating the consequences of keeping or culling the cow herself or her offspring.—N. J. SCORGIE.

BECHTEL, H. E., & McLEOD, W. M. (1945.) Latex in the preparation of corrosions of mammary glands.—*Amer. J. vet. Res.* 6. 17-20. 754

The freshly excised udder is suspended from a wooden frame and milked as thoroughly as possible.

A weak acid solution (10 ml. glacial acetic acid to 1 litre water) is injected *via* the teat into each gland until it is perceptibly swollen. The acid is then allowed to drain out through teat cannulas and the remainder is removed by milking. Neoprene latex is then injected

under pressure *via* the teat into the udder, until the lobules become hard and visibly outlined through the skin. The teat is then tied tightly. The udder is immersed in commercial HCl for about a fortnight. When corrosion is complete, it is washed in running water. The finished latex cast can then be immersed in weak formalin, or dried. In the latter case, the latex darkens.

It is found that this method, besides giving a flexible cast, also reveals the anatomical arrangement of the milk-containing structures, in greater detail than any other known injection material.—J. G. CAMPBELL.

*See also absts.* 552 (cultivation of tubercle bacilli), 574 (preservation of living sporozoites by chilling), 592 (cultivation of rickettsia), 666 (sperm diluents).

## MISCELLANEOUS

PALESTINE. (1945.) **Animal Diseases Ordinance.** Rules made by the High Commissioner under Section 19. [Animal Diseases Citation (African Horse-Sickness) Rules, 1945.]—Extract from suppl. No. 2, to the *Palestine Gaz.* No. 1415, June 7th. pp. 658-659. 755

By a notification dated June 7th, 1945, rules are made under the Animal Diseases Order providing for the compulsory vaccination of horses and mules against African horse sickness. The rule is stated to be "a protective measure against the recurrence of that epidemic, the outbreak of which in Palestine last year caused considerable loss which would yet have been much greater without the general vaccination of horses and mules applied at that time". Vaccination is to be carried out free of charge.—M. C.

I. INDIA. (1944.) Department of Education, Health and Lands. Notifications Nos. F.32-12 (13)/44/A, F.32-12 (14)/44-A, and F. 32-12 (15)/44-A. pp. 2. Simla, India: Department of Education, Health and Lands. 756

II. INDIA, BOMBAY. (1944.) Notification No. 7858/24.—*Bombay Govt. Gaz.* Sept. 7th. 127-129. 757

III. INDIA, BENGAL. (1944.) The Bengal Live-Stock (Import) Quarantine Rules, 1944, No. 3711 Vety. pp. 2. Bengal: Department of Agriculture. fcp. 758

IV. INDIA, SIND. (1944.) Live-Stock (Import) Quarantine Rules, 1943, No. 986-G.D./39. pp. 4. Karachi: Govt. Press. 4to. 759

V. INDIA, MADRAS. (1944.) Madras Livestock (Import) Quarantine Rules, 1944. (G.O. Ms. No. 8039, Development, 12th July 1944.) pp. 4. 760

I. A general notification by the Central Government of India, scheduling the infectious and contagious diseases and the classes of animals concerned and prohibiting the importation of livestock into India except through the ports of Bombay, Calcutta, Karachi and Madras.

II, III, IV & V. Notifications by each of the governments concerned, written in identical terms and establishing a uniform system governing import of livestock. Important points are the diseases to be dealt with, the countries from which valid certificates of freedom from disease will be accepted, the class of veterinary officers in each country whose certificates will be recognized and the tests to which imported livestock may be subjected. Interesting items in the schedule of diseases are "tick pest" which is defined as "infestation with parasite-tricks", blowfly strike and heartwater. Details of inspection on arrival, detention, quarantine, etc., are given.

Administrative veterinary officers in all countries from which livestock are exported to India should have

reference copies of the regulations. Copies can be obtained on application to the Secretary, Imperial Council of Agricultural Research, New Delhi, India. —M. C.

GREAT BRITAIN. (1945.) **The Improvement of Live-stock (Licensing of Bulls) (England and Wales) Regulations, 1945.**—*Stat. Rules & Orders.* No. 540. pp. 10. London: H.M. Stat. Off. 3d. 761

Regulations made by the Ministry of Agriculture and Fisheries under the Improvement of Livestock (Licensing of Bulls) Act, 1931, as amended by the Agriculture (Miscellaneous Provisions) Act, 1944, provide that the prescribed age of the bull shall be ten months, and that an "approved breeding society" means one of the cattle-breeding societies named in the first schedule to these regulations.

The manner and time for making applications for licence or permit and their various forms, changes in class of licence, replacement of lost licences, conditions as to inspection and marking of a bull, changes in the place at which bulls may be kept, application for referee's inspection, fees, and service of documents are prescribed.—M. C.

MERRILL, G. G. (1945.) Breaking the killing habit in dogs by inhibiting the conditioned reflex.—*J. Amer. vet. med. Ass.* 107. '69-70. 762

The killing habit in dogs is thought to be due to the establishment of a conditioned reflex connecting the stimulus of the sight of sheep or chickens with the response of killing them. In the case of two Great Danes which were sheep killers and a Dalmatian bitch which killed chickens, the habit was broken by confining the dogs for some weeks in close proximity to their prey. It is believed that the conditioned reflex was inhibited by permitting the stimulus without the associated response.—RACHEL MARSHALL.

COLE, G. E. (1943.) The medical officer of health and his reports: Is writing health reports a lost art?—*Hlth Bull., Melb.* Nos. 75 & 76. pp. 2044-2049.

[Abst. in *Bull. Hyg., Lond.* 20. 56, copied *verbatim*. Signed: J. M. MACKINTOSH.] 763

From time to time we ask whether health propaganda is really filtering through to the people who need it most. The answers of the present day, in spite of the stalwart efforts of the Central Council for Health Education, are not very encouraging. Among the many possible sources of public information the annual report of the medical officer of health has great potential value. It could present its matter in a way that could stir local interest, because it is telling the people about themselves; it could create a healthy rivalry between neighbouring health authorities; and it could tell the people in simple terms how far they fall short of national standards, or



give them a sense of pride, if they rose above these standards.

Dr. G. E. Cole, the District Health Officer for the Western Health Area of the State of Victoria, Australia, wonders whether the writing of health reports is a lost art. After examining a group of annual reports from a Victorian town, printed from the 'sixties to the end of last century, he finds that many of them contain a wider range of health survey than the modern reports. Their weakness in statistics is counter-balanced by vigorous description of defects, and bold recommendations for action. The older medical officers were more forthright in criticism. One would rarely find, for example, in a report of to-day, such a cudgelling as this:—

"The near prospect of an invasion by the justly

dreaded plague roused the corporation to a sense of its responsibility as the guardian of the public health.

... That it required so powerful a stimulus to bring about such a result shows how dead the community had become to the most ordinary sanitary requirements".

Perhaps our local authorities nowadays do not deserve an annual spanking, but many communities would be none the worse for a little straight talking about health.

Dr. Cole's own recommendations are a trifle humdrum, but his two main points are worth bearing in mind: that the reports should tell the authorities what their officers are doing; and that, when a recommendation is made, the next report should state what action, if any, has been taken.

## REPORT

U.S.A. (1942.) Report of the Secretary of Agriculture, 1942. pp. 220. Items of veterinary interest pp. 189-191. Washington, D.C.: Supt. of Documents. 25 cents. 764

The greater part of this report deals with agricultural matters which are not of direct interest to the veterinarian. The section on animal husbandry, however, makes interesting reference to a number of veterinary matters. TUBERCULOSIS eradication progresses satisfactorily. 11,000,000 tuberculin tests were applied in 1942 and the proportion of reactors was 0.25%. Vaccination for the prevention of BRUCELLOSIS is carried out on calves 4-5 months old, 147,000 calves having been treated between January 1st, 1941, when calfhood vaccination was first officially recognized, and the time of writing the report. At the end of the 1942 fiscal year, 549 counties in 24 states were classified as modified accredited Bang's disease-free areas, i.e., the disease could not be found in more than 1% of cattle or in 5% of herds in the county. All dairy and breeding cattle over six months old are tested and reactors are

slaughtered, the State and Federal Governments compensating the owners for the loss.

Sulphaguanidine is used to treat COCCIDIOSIS in livestock and poultry, and sulphur mixed with the feed is credited with its control in sheep in feedlots. The losses from ENCEPHALOMYELITIS in horses have been greatly reduced by vaccination. In 1941, 462,000 animals were vaccinated and only 213 developed the disease. The loss in unvaccinated animals was 13 times as great. The losses resulting from PARASITIC INFESTATION are stressed. The larvae of swine *Ascaris* may be carried to the heart and other parts of the body and cause serious damage. Nodular worms are responsible for the loss of 100,000,000 pounds of mutton annually and in addition render the intestines of infected sheep unsuitable for the preparation of surgical sutures or for sausage skins. Phenothiazine, combined with pasture sanitation, is being used in the control of nodular worms. The importance of REDWORM DISEASE (STRONGYLOSIS) in horses is stressed and the usefulness of small daily doses of phenothiazine in its control is mentioned.

—T. E. GIBSON.

## BOOK REVIEW

HEWER, E. E. [D.Sc. (Lond.); Reader in Histology in the University of London and Lecturer in Physiology at the London School of Medicine for Women.] (1944, reprinted 1945.) Textbook of histology for medical students. pp.viii + 364. 344 figs. London: William Heinemann (Medical Books) Ltd. 3rd edit. 4to. 17s. 6d. 765

The object of this book, written by a teacher of 25 years' experience, is to provide a practical histology for the use of medical students. As such it is to be highly recommended and since there is marked similarity between human and animal tissue, it should be also of value to the veterinary student and research worker.

The text is clearly set out and contains all the

essential facts of histology without these being confused by the introduction of controversial issues and points of more academic interest. The photomicrographs and line drawings are excellent. These forms of illustration are straightforward and best suited to an appreciation of the actual microscopic field. The value of combining the two types of figuration is well exemplified in the chapter on the central nervous system, where traced line drawings of brain sections giving more detail are shown alongside the photomicrographs.

In this the third edition the text has been brought up to date wherever possible and many new photomicrographs have been included. The publishers are to be congratulated on the quality of the 1945 reprint.

—C. W. OTTAWAY.

See also abstr. 642 (minerals in pasture).



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